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# CANADIAN GEOGRAPHICAL JOURNAL

CONTENTS

CANADA'S LOBSTER FISHERY
THE SOVIET NORTH AND THE CANADIAN NORTH
THE CYCLADES ISLANDS
ANOUTOALOAK: THE MACE OF THE NORTHWEST TERRITORIES
THE ELUSIVE ISLAND OF BUSSE

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## CONTENTS

SEPTEMBER 1957 ✦ VOLUME LV ✦ NUMBER 3

COVER SUBJECT:—*Lobster boats off Canada's east coast on the opening day of the season. (see page 88)*
National Film Board photograph

Page

CANADA'S LOBSTER FISHERY . . . . . 88
*by D. G. WILDER*

THE SOVIET NORTH AND THE CANADIAN NORTH . . . . . 108
*by O. FISHER*

THE CYCLADES ISLANDS . . . . . 116
*by J. A. S. EVANS*

ANOUTOALOAK: THE MACE OF THE NORTHWEST TERRITORIES . . . . . 120
*by IRENE BAIRD*

THE ELUSIVE ISLAND OF BUSSE . . . . 124
*by T. DUNBABIN*

EDITOR'S NOTE-BOOK . . . . . VII

THE TRAVEL CORNER . . . . . VII

AMONGST THE NEW BOOKS . . . . . X

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# Canada's Lobster Fishery

by D. G. WILDER

Photographs courtesy of Department of Fisheries except where credited.

## Introduction

ODDLY enough the most important inshore fishery on Canada's Atlantic coast is based on a marine animal that does not even resemble a fish. Although this creature has gills and can swim, it has no backbone, scales or fins. It belongs to a group of animals known as decapod crustacea, so called because they have ten legs and a crust-like shell. Its close relatives include the crayfishes, shrimps and prawns. This highly prized object is known to biologists as *Homarus americanus* or in simpler language, the American Lobster. The almost identical European lobster is called homard in France and hummer in Norway, Sweden, Denmark and Germany.

Many thousands of fishermen, dealers and processors depend on lobsters for a large share of their income. The bizarre, colourful appearance and the excellent flavour of its firm, white flesh, naturally garnished in bright red, create a heavy demand for this marine delicacy. To supply the demand, a very intensive fishery has been developed and lobsters are continually in danger of being overfished. Proper management to make best continuing use of this extremely valuable resource is of utmost importance to all concerned. Sound management procedures must be based on thorough knowledge of the lobster's life history and an understanding of the factors that control its reproduction, growth and survival.

## History of the Fishery

Lobster fishing started in Canada over 100 years ago but remained on a small scale until 1870, when the fishery started to expand rapidly. Rich, new fishing grounds were discovered and more men using more boats and gear entered the fishery. Some of the early statistics on landings are of questionable accuracy but it seems clear that for the next 15 years the catch rose rapidly to reach a peak of about 100 million pounds in 1885. A 33-year period followed during which the catch dropped steadily to reach a low of about 27 million pounds in 1918. Since 1919 the fishery has had a number of ups and downs but there is no evidence of a general decline. Production during the past five years (1951-55) has averaged about 48 million pounds, worth over 15 million dollars to the fishermen and over 20 million dollars on the market.

When fishing started the grounds were heavily populated with large, old lobsters that had accumulated for many years. In 1873 lobsters in New Brunswick and Nova Scotia averaged two and a half to three pounds in weight — two to four times as large as the average run to-day. As the fishery expanded the average size declined rapidly. Even before the fishery reached its peak in 1885 there was a general alarm at the decreasing size. This decline in size gradually levelled off and in most areas there has been no great change in the sizes of lobsters caught during the past forty years.

These abundant large lobsters provided excellent fishing for a number of years. However, annual landings were far greater than the grounds could produce on a year-to-year basis and the accumulated supply was gradually fished out. To-day's catch is determined largely by the amount of lobsters the grounds can produce each year under present conditions with the existing fishery regulations as they are now observed. We should be foolish, perhaps, to expect that the catch in Canada will ever again

approach 100 million pounds. There is, however, every reason to believe that with the right fishery regulations, properly observed, we can make much better use of this valuable resource.

### Appearance and Colour

The body of the lobster is divided into two regions — the combined head and thorax covered by an unjointed shell and popularly referred to as the "body" and the abdomen which is in six sections and more commonly known as the "tail". The shell is made of horn-like chitin hardened with lime salts. The head is provided with a "horn" or rostrum, a small mouth, a pair of stalked eyes, two pairs of antennae and three pairs of mouth parts. The thorax carries three more pairs of mouth parts, twenty pairs of gills hidden under the shell and five pairs of legs. The first pair of legs are large and armed with strong claws, one of which, the crusher claw, is usually considerably heavier than the more slender biting claw. If the large claws are severely damaged or if an active lobster is held by the claws and struggles to escape, it may throw off one or both claws. The claw breaks off cleanly at a joint near the body and there is little or no bleeding. A new limb soon sprouts from the old stump but it may take several years to reach normal size. Defective or deformed claws are quite common and probably result from injuries in different stages of development. Five pairs of small paddles or swimmerets occur on the under side of the abdomen. The body ends in a wide flattened tail fan. Other important sense organs are the numerous sensory hairs or bristles with which various parts of the body are well supplied.

Possibly the most noticeable difference between males and females is in the first pair of swimmerets on the under side of the tail. On the male these are relatively large, hard, smooth and tapering and are grooved on the inner surface. They are used during mating to transfer sperm to the sperm sac of the female. The corresponding swimmerets on the female are soft and small. Mature males have larger claws, longer bodies, narrower tails, longer and sharper spines on the under side of the tail and weigh considerably more than females of the same length.

On some parts of the coast adult lobsters are usually greenish-blue speckled with dark spots,

*Their boats loaded with traps, lobster fishermen approach the grounds on the opening day of the season, the "setting day".* N.F.B.

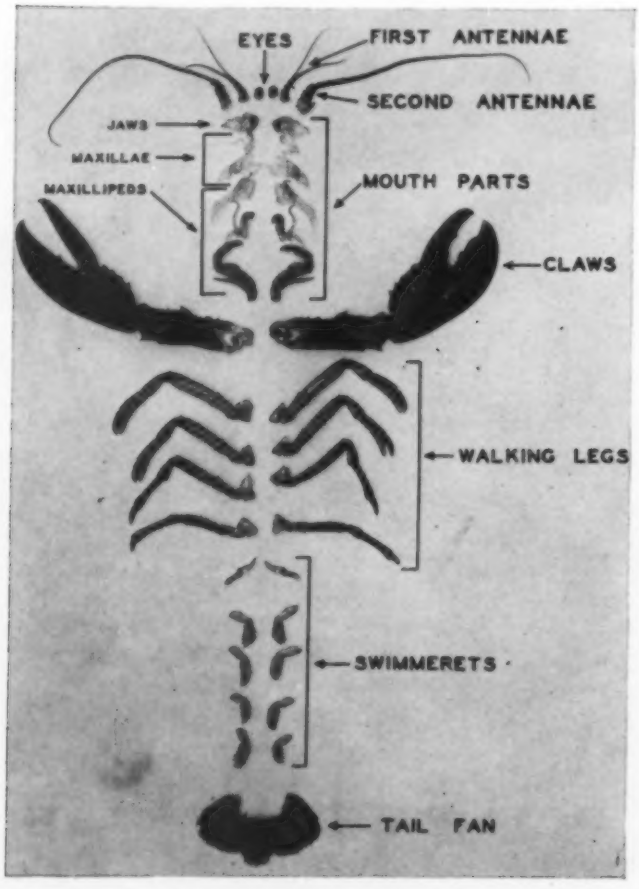
whereas in other sections the general appearance is reddish-brown. The colour is due to red, yellow and blue pigments which in various combinations produce the different colour patterns. Occasionally, spotted or calico lobsters are found that show a bold pattern of large, yellow spots on a darker background. More rarely lobsters are caught with one side of the body an entirely different colour from the other. Now and then lobsters are caught that apparently lack all but one of the pigments. Such lobsters are a vivid blue, bright red or rich yellow colour.

### Internal Anatomy

The lobster has a rather simple nervous system. This consists essentially of the brain, a small whitish mass between the bases of the eyes and a chainlike nerve cord running the length of the body. The digestive tract includes a large stomach equipped with three large grinding teeth or "millstones" which grind the food into tiny particles, a short, straight intestine leading to the anus at the base of the tail fan, and a large greenish digestive gland. The digestive gland, commonly known as tomalley, is considered by many to be the most tasty part of the lobster. The heart, located behind the stomach, pumps the colourless blood to all parts of the body. The dark green paired ovaries of the female turn bright red on cooking and are known as coral — a special treat for the lobster enthusiast. The whitish paired testes of the male are considerably smaller than the ovaries. The kidneys, or green glands, are in a rather peculiar place at the base of the antennae.

### Distribution

The American Lobster occurs from the Strait of Belle Isle in the north to North Carolina in the south. It is generally abundant in the central part of its range, the richest fisheries occurring in the State of Maine, southern Nova Scotia and the southern Gulf of St. Lawrence. The North American catch for the year 1950 totalled about 73 million pounds of which about two-thirds were caught in Canadian waters. A very close relative occurs in northern Europe but the catch is only about one-tenth as large as in North America. The great bulk of the lobster population lives in the coastal waters at depths of less than 150 feet.

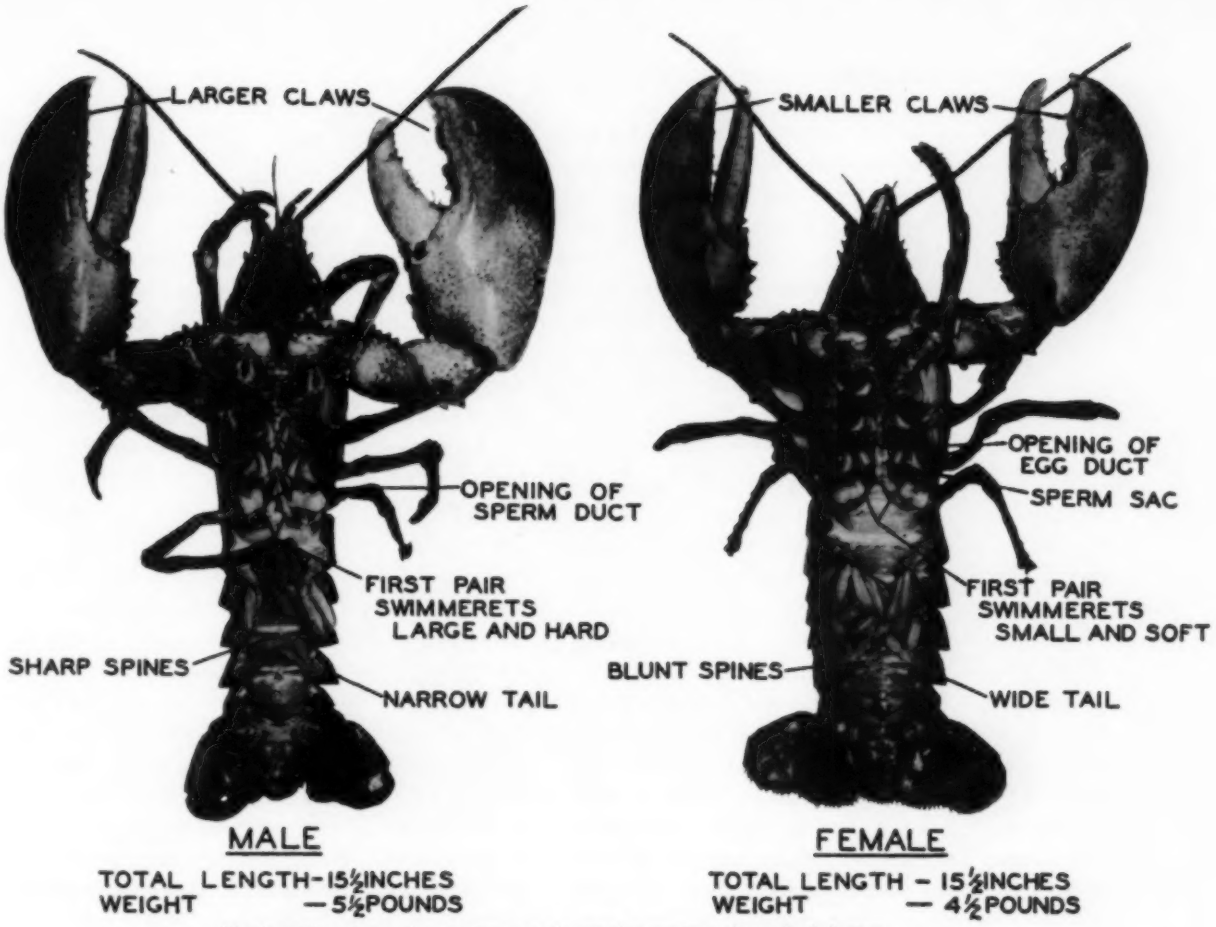



*Appendages of the American Lobster.*

### Behaviour and Feeding

In its natural habitat the lobster is agile, wary, pugnacious and capable of defending itself against larger and more powerful enemies. In search of food, it walks nimbly on the tips of its slender legs aided by the rhythmic beating of the swimmerets. The long, sensitive antennae or feelers sweep back and forth, continually. The large claws are effective weapons against enemies and useful tools for capturing food. If suddenly disturbed, the lobster often escapes by rapidly flexing the powerful tail muscles and shooting backward with amazing speed. When not actively feeding, it usually lies hidden in a rock crevice, in a bunch of seaweed, or burrowed in the mud. Lobsters are usually most abundant on rocky bottom, probably because hiding places are more plentiful there. In general, they are most active at night but in some areas at certain times of the year fishermen make good mid-day catches.

The adult feeds mainly on fish, alive or dead, on other crustaceans and shellfish. All the fixed




*Underside view of a mature male and a mature female lobster.*

or slow-moving animals on the bottom, such as clams, mussels, starfish, sea urchins, crabs and worms, serve as food. Bottom-living fish such as flounders and sculpins are undoubtedly caught alive. The heavy crusher claw looks like an excellent tool for crushing hard-shelled shellfish but it is doubtful if it is actually used for this purpose. In captivity at least, lobsters eat clams by holding them with their complicated set of mouth parts and biting off bits at the edge of the shell until they reach the meat. In searching for food, the lobster uses its sensitive antennae and sensory hairs more than its eyes.

#### Lobsters Are Not Migratory

Big differences in the catches from day to day and at different seasons have led many fishermen to believe that lobsters are migratory and, like the mackerel, herring and tuna, move great distances. An understanding of the lobster's movements is so basic to good management that this question has been studied thoroughly. In the past 25 years over 125,000 tagged and marked lobsters have been liberated in Canadian waters. Reports of fishermen who have recaptured over half of these show clearly that lobsters are not migratory. Some wandered along the coast in both directions and several moved quite a few miles. The prize travellers were two that had travelled from southern Grand Manan, New Brunswick, to Mount Desert Island, Maine, a straight-line distance of about seventy miles over a period of five to six months. However, most of those recaptured were found very close to the spot where they were released — on the average they moved less than two miles.

Ups and downs in the catch are caused not by migration but by actual changes in the abundance of lobsters and their activity. Where intensive fishing is carried on, particularly during warm weather, the stock is quickly caught up and the catch drops off rapidly. In such an area fishing remains poor until the next growing season when more lobsters reach commercial size. Generally lobsters are most active and

easiest to catch in the summer when the water is warm. Their body temperature and consequent activity vary with the temperature of the water around them. Fishing is nearly always poor in mid-winter. Heavy winds move large masses of water and cause sudden, marked changes in the bottom water temperature. Such changes have a striking effect on the lobster's activity and the catch rises or falls accordingly.

### Moulting and Growth

When a lobster has outgrown its hard, inelastic shell it casts it off in one piece—a process known as moulting or shedding. Most of them moult during July, August and September but the time varies considerably on different parts of the coast and from year to year depending mainly on the water temperature. A lobster preparing to moult can be recognized by the dark, dull colours of the old shell, and the reddish tint of the membranes at the joints. As moulting preparations continue the old shell softens appreciably in certain critical areas. With the lobster bent in a V shape the membrane joining the body and tail splits across its upper surface. Gradually the lobster draws itself through this gaping split until finally with a few flips of its tail it becomes completely free from its old shell. The whole process takes from five to twenty minutes. The shell of a newly-moulted lobster is clean and bright but soft as a rag. The large claws are shrunken and shapeless.

Immediately after moulting the lobster absorbs sea water and swells in an amazing fashion to reach its new size in four to five hours. Commercial-sized lobsters grow about fifteen per cent in length and fifty per cent in weight at each moult. Although the newly-moulted lobster quickly reaches its full size the shell remains soft and the meat watery for some time. Gradually as the lobster feeds, the shell hardens and the meat becomes firmer, this process taking from a few weeks to several months, depending on the size of the lobster, the water temperature and the food supply.

The lobster's growth rate is determined not only by the amount it grows at each moult but also by the number of moults. Recent studies indicate that newly-hatched lobsters moult five to seven times during their first growing season but less frequently each succeeding year. One moult a year is common among commercial-sized lobsters but some very large lobsters moult only every few years. Such infrequent moulters are readily recognized by their dark, worn and often scarred shells which usually carry a good supply of marine growths. No doubt growth varies considerably from place to place and year to year. In the southern Gulf of St. Lawrence 7½-inch lobsters, weighing half a pound, are about five years old and those 9½ inches long, weighing a pound, about seven years old.

The world's record lobster, caught in deep water south of Boston in 1935, was more than three feet long overall and weighed forty-two and a half pounds. This giant may have survived for fifty years or more. New lobster grounds have recently been discovered in deep water (600 to 2,400 feet) along the Continental Shelf. Lobsters on these grounds run large with some reaching twenty-five to thirty pounds and a few, according to unofficial reports, as large as fifty pounds. If fishing in this area continues, the official record may soon be broken.

### Maturity and Mating

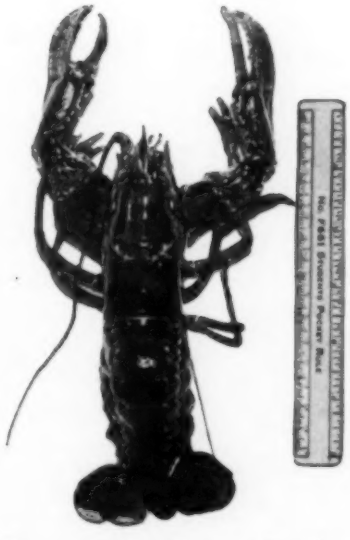
In the southern Gulf of St. Lawrence where the water is warm in summer, some lobsters mature when they are as small as seven inches, weighing less than half a pound. In such areas mature lobsters are relatively abundant. In the Bay of Fundy the water is much cooler during the summer months. Here the smallest mature lobsters are about twelve inches long and weigh about two pounds. In many Bay of Fundy areas they are often caught before they reach this size with the result that mature individuals are scarce. Mating usually occurs a few hours after the female has moulted when her shell is still very soft. The male, which usually moults several weeks earlier, is fairly hard-shelled. During mating, which lasts about a minute, the male transfers sperm to the sperm sac of the female which is located between the bases of the last two pairs of legs. Egg laying occurs from a month to a year or more after mating. At that time the female releases enough sperm from her sperm sac to fertilize the eggs. The male usually mates with a slightly smaller

*Lobster at start of moulting.*

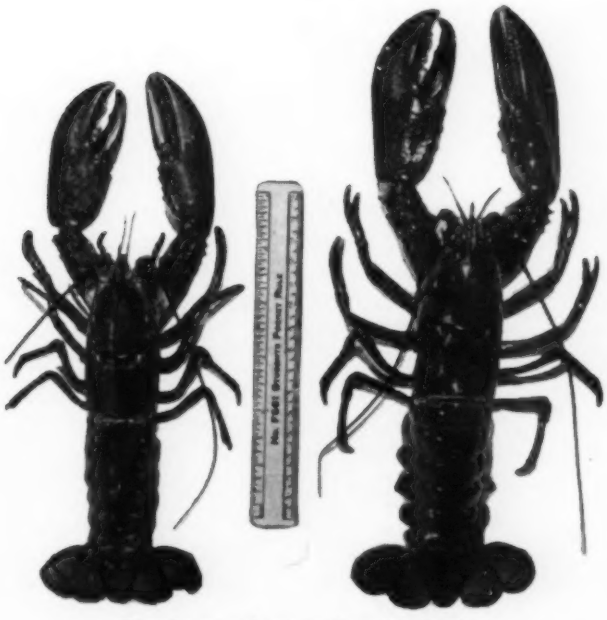
*Same lobster, ten minutes later.*

*Fourteen minutes later.*

*Fifteen minutes later—moult completed.*



*Fifteen minutes after moult—claws not filled out.*



*Five hours after moult—old shell on left; newly moulted lobster (right) has swollen to full size.*



*Photographs of a lobster moulting.*

*Young lobsters in early stages of development, during which they moult three times. Only the lucky few survive.*

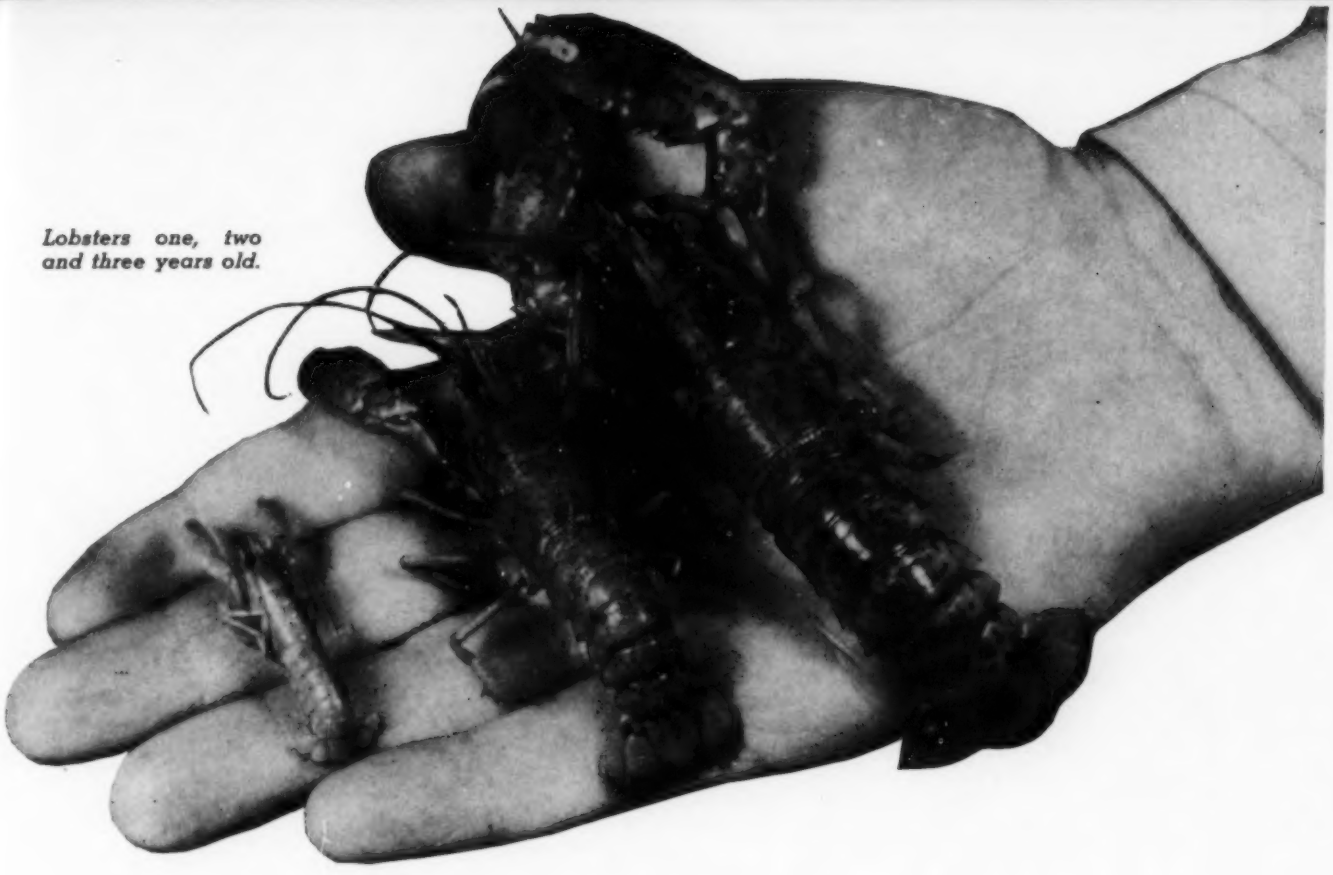
female but lobsters greatly different in size do not mate successfully.

### Egg Laying and Hatching

When laying eggs the female rolls over on her back and supports the raised front part of her body with her widespread claws. The eggs are laid through two small openings at the bases of the second pair of walking legs and flow down six to eight abreast into the pocket formed by the curled tail. As they pass over the sperm sac they are fertilized by sperm deposited there during mating and then become fastened to the swimmerets by a glue-like substance. The female usually takes several hours to lay a complete batch of eggs and as a rule lays eggs every other year. The newly laid eggs are round, about one-sixteenth of an inch in diameter and are dark green, almost black, in colour. The egg-laying period is from early June to September. A seven-inch female lays about 3,000 eggs and an eighteen-inch female an average of about 75,000. The egg-bearing female usually folds her tail thus forming a pocket in which the eggs are protected. At times she extends her tail and moves her swimmerets back and forth, in this way aerating and cleaning the eggs. Such patient, parental care continues for almost a full year before the eggs hatch. During this period the tiny lobsters developing within the eggs live on the dark green yolk. As the yolk is used up the eggs grow somewhat larger and become lighter in colour. Shortly before hatching the black eyes of the tiny lobsters can be seen through the egg membranes.

When the eggs are ready to hatch the female stands on the tips of her walking legs with her large claws stretched out in front and the tail raised at an angle. The swimmerets with the attached eggs are then waved violently for about half a minute. This creates a current which carries hundreds of newly-hatched lobsters up towards the surface. This is repeated several times at short intervals but it usually takes the female about two weeks to hatch her complete batch of eggs. In warm water areas hatching starts in mid-June, reaches a peak in July and continues on a much reduced scale to the end of September.

Newly-hatched lobsters are about one-third of an inch long and bear little resemblance to the adult. During daylight hours they spend most of their time swimming at or near the surface of the water. Each night they scatter to



*Lobsters one, two and three years old.*

greater depths. The length of the free-swimming period depends mainly on the water temperature — about a month if the water is warm but up to two months in cooler water. During this period the tiny lobsters moult three times, changing form and growing appreciably at each moult. When they reach the fourth stage, they are slightly over half an inch long and resemble the adults both in shape and colour. Although these tiny lobsters can swim they are easily carried to and fro by surface currents. When they settle to the bottom towards the end of the fourth stage, they may be many miles from where they were hatched. During the free-swimming period the almost defenceless young lobsters are preyed upon by innumerable fishes, other marine creatures and probably certain sea birds.

### Young Lobsters

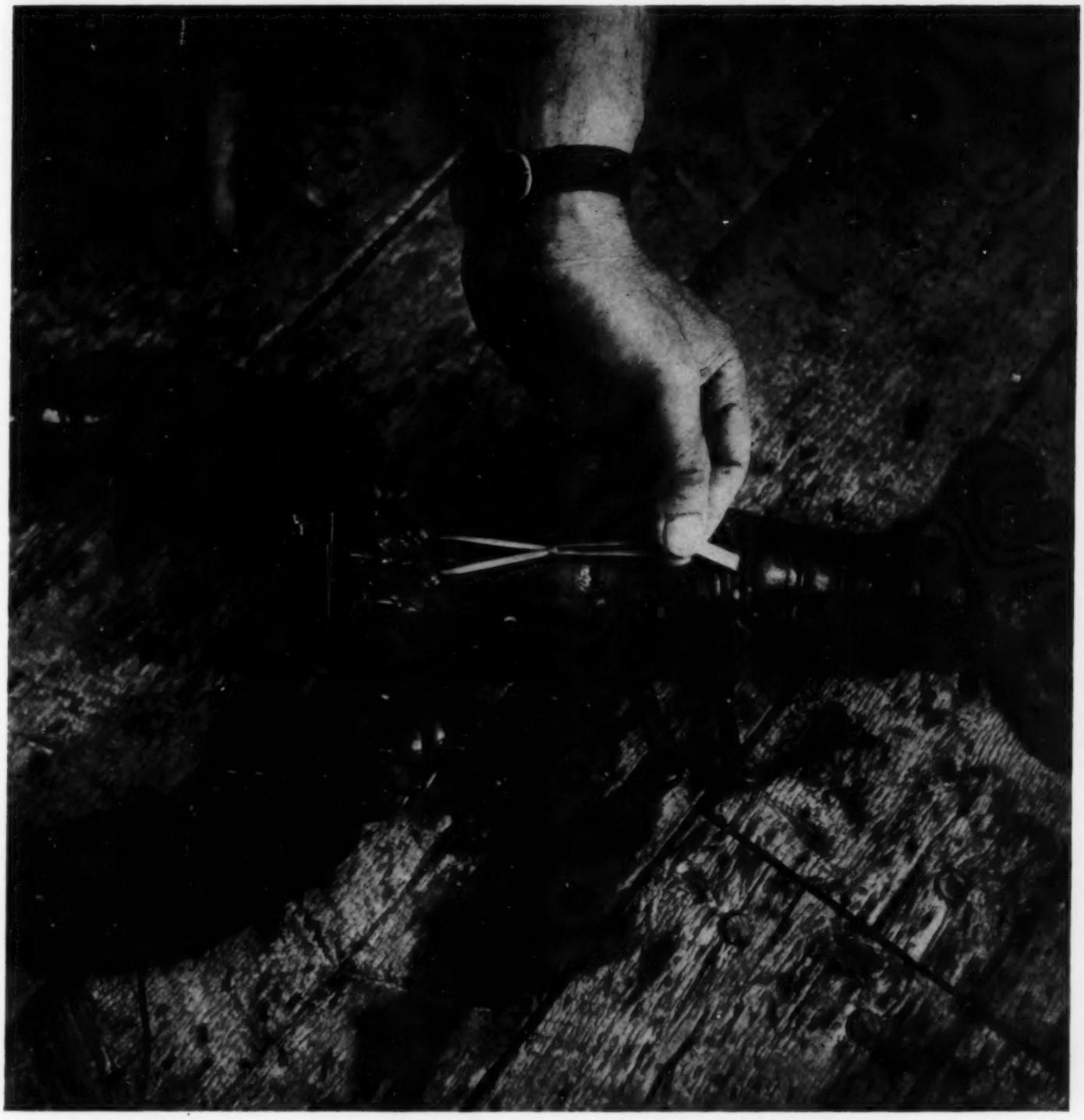
Until recently almost nothing was known about the natural habits and growth of young lobsters from the time they settled to the bottom until they reached the sizes caught in the commercial fishery. Some had, of course, been raised in captivity and a few had been found under stones at low tide. Other than that, these lobsters continued for many years to baffle those who tried to catch them. Recently, however, they have been caught quite consistently in a new type of fine-meshed bottom drag. They seem to behave much like the adults and are distributed over the bottom in much the same fashion. Like their parents they show a strong preference for rocky bottom. By their first birthday they have reached a length of only one to one and a half inches. The two-year-olds range from two to three inches in length and the three-year-olds from three to four inches.

### Enemies of the Lobster

Throughout their life, lobsters like all other animals are subject to attack by predators, parasites and disease. The newly-hatched lobsters are particularly vulnerable and only the lucky few live through the short free-swimming period. After the young settle to the bottom they are less exposed but many are searched out and eaten by a great variety of fish and other marine animals. The cod fish is a notorious enemy, eating all sizes up to at least eight inches. Dogfish, skates and catfish take their toll. Many fishermen report that seals eat quite large lobsters. Generally, however, large, hard-shelled lobsters with their two formidable

*Huge specimen taken in the Bay of Fundy. This one would weigh about twenty pounds.*

claws are fairly immune to attack by predators. From the time lobsters reach legal size, there is little doubt that man himself is their worst enemy. This fact is shown most clearly by the large numbers of tagged lobsters that fishermen recapture. For many years thousands of commercial-sized lobsters have been tagged and spread over the fishing grounds at the start of the fishing seasons. Fishermen have recaptured over half of these. In one particular area tag returns each season over the past ten years have averaged seventy-five per cent. Since tagged lobsters are no easier to catch than untagged ones, it seems clear that fishermen in this area each season catch about three-quarters of the commercial-sized lobsters that are on



*Tagged lobster. A numbered metal strap is hooked over the back edge of the body shell and held in place by a rubber band around the "horn".* Canada Wide Feature Service

their grounds. The small size of the lobsters also shows the effect of the fishery. In such areas most are caught when they are only one to two inches larger than the minimum legal size. Few escape to grow larger.

Apart from predators, lobsters at times are attacked by parasites and disease. Fortunately such attacks are rather uncommon and do not under natural conditions appear to cause serious trouble. None of these organisms are harmful to man. Although lobsters are relatively free of true parasites, they are often encumbered with a great variety of living forms. Barnacles, mussels, other less well-known animals and even certain kinds of marine plants are often found securely attached to the lobster's shell.

These are probably little more than minor inconveniences but in any case the lobster completely frees itself of such encumbrances each time it moults.

### Hatcheries and Rearing Stations Impractical

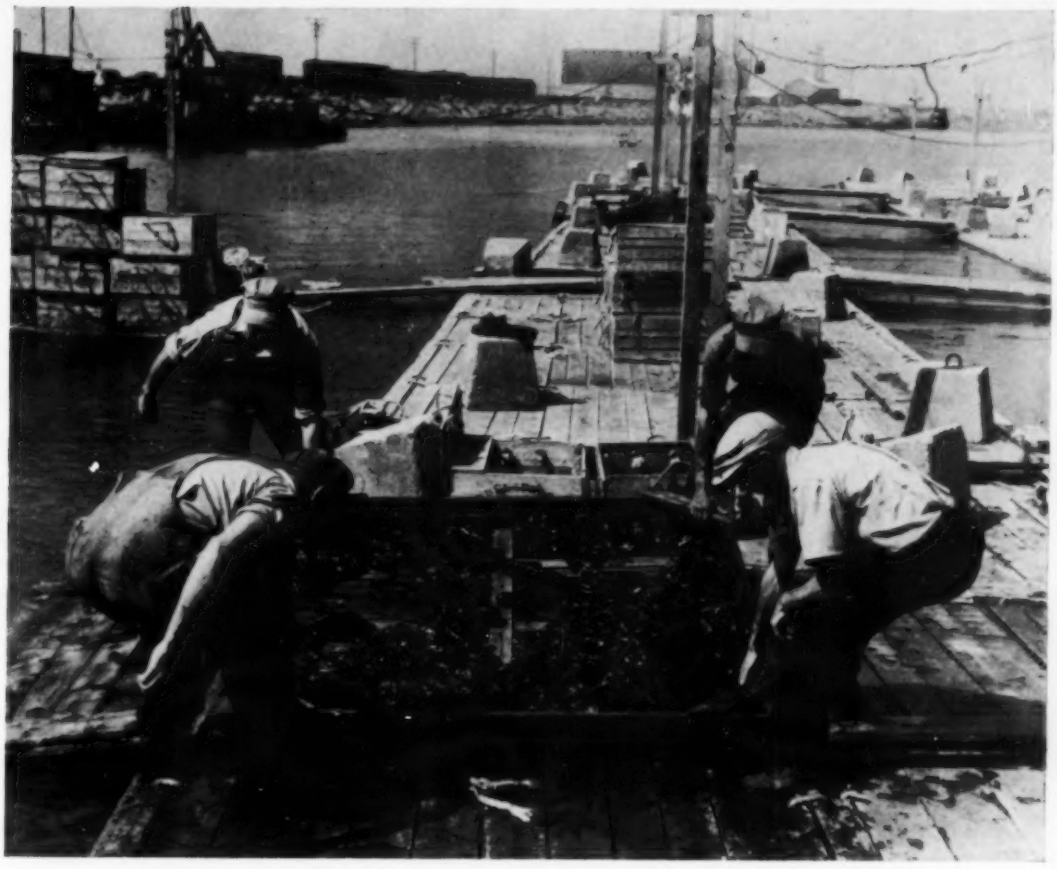
In the early days of the fishery the egg-bearing females received no special protection. As a result countless millions of eggs were destroyed. This, together with the drastic decline in landings which started about 1887, stimulated the establishment of the first Canadian lobster hatchery in 1891. By 1912, there were fourteen of these hatcheries in the southern Gulf of St. Lawrence and eastern Nova Scotia. Eggs were placed in jars in running sea water and as soon as they hatched the tiny lobsters were liberated. Theoretically this simple operation should have salvaged many eggs that otherwise would have been destroyed. In actual practice, however, only a very small fraction hatched successfully. On the other hand, egg-bearing females, if left undisturbed, can hatch practically all their eggs. It was concluded therefore that with proper protection of the egg-bearing females the hatch would be far greater than the hatcheries could produce. All lobster hatcheries were closed in 1917 and have never been re-opened.

Towards the end of the last century it was found that newly-hatched lobsters could be reared in captivity. This discovery aroused great hopes that large numbers could be reared through the vulnerable free-swimming period with much fewer losses than occur in nature. Several rearing stations were built in the United States at the turn of the century but to-day only one or two are in operation on a relatively small scale. In general, losses of tiny lobsters in the rearing stations were disappointingly high owing to crowded conditions, parasites, disease and cannibalism. In some cases, however, many thousands of lobsters were reared to the last free-swimming stage. This production was insignificant compared to the untold millions of young lobsters produced naturally. In no case were enough young planted to have any appreciable effect on later commercial landings. Another stumbling block was the high cost of rearing—in most cases much too high for practical consideration. Clearly, rearing of lobsters by present methods can not be relied upon to maintain or increase commercial production.

### The Fishery

Canada's lobster fishery is exclusively a small boat operation. Each day from hundreds of harbours scattered along the coast, thousands of fishermen, some in punts, skiffs and dories but more in trim, often brightly-coloured motor boats, set out to harvest their share of our Atlantic coast's most valuable inshore crop. The smoothly-powered open motor boats, up to forty-five feet in length, are well designed and equipped for the job at hand. Most are

*Fishermen haul in a trap from waters off Prince Edward Island.*



*Lobster car operators culling lobsters before shipping them to market.*

fitted with power-driven haulers to lighten the back-breaking task of hauling hundreds of traps. Some are equipped with electronic echo sounders which help fishermen locate good lobster grounds quickly. The usual crew is two men, sometimes father and son, sometimes brothers, but more often the skipper and a hired hand. The two work smoothly as a team with the skipper directing operations and sharing most of the tasks. Some of the smaller boats are operated by one man; occasionally the larger boats have a crew of three. On some sections of the coast where small harbours are plentiful the boats are dispersed along the shore. In other areas more than 100 boats may be concentrated in one harbour. Here the opening of the lobster season is an impressive sight. As the boats loaded with traps, buoys, and rope, jockey for position, relatives and friends line the wharves for a cheerful send-off. The atmosphere is one of excitement, anticipation and finally impatience as the fishermen await the starting signal. At last the word is given and the boats fan out from the harbour, each fisherman with high hopes, spurred on perhaps by good pre-season reports, that his catch this season will be better than last year's.

Many years ago when lobsters were extremely abundant considerable numbers could be speared or gaffed along shore at low tide. Larger quantities were caught in hoop traps — a simple iron ring or hoop with a bag net attached. These methods were later abandoned and lobsters today are caught almost exclusively in lobster traps. The size, shape and detailed construction of these vary considerably from place to place.

Basically the popular trap is in the form of a half cylinder with three or four curved wooden bows fitted into a rectangular wooden base. The bottom, sides and top of the trap are closed in with laths. One or both ends of the trap are closed in with laths or hand-knitted cotton or nylon netting. The trap is usually divided into two compartments, the "kitchen", where the bait is fastened to a cord or wooden spindle, and the "parlour" or "bedroom". Usually two but sometimes three mesh funnels ending in 4 to 6 inch diameter rings lead to the kitchen. A similar, single funnel leads from the kitchen to the parlour from which escape is more difficult. The bottom of the trap is ballasted with flat stones. A door for baiting the trap and removing the catch runs the length of the trap at the top. In some areas the popular traps have sloping sides and flat tops. They are two and a half to four feet long, one and a half to two and a

*The end of the lobster season. The traps are landed and stored away until the fishing season opens again.*

half feet wide, and one to one and a half feet high. The larger traps, when heavily ballasted, sometimes weigh in excess of 100 pounds. Traps are usually left unpainted but in some areas they are dipped in hot tar to protect them from shipworms. In most areas single traps are fastened to a cedar buoy with 50 to 250-foot manila lines for fishing in depths up to 150 feet. The cedar buoys are brightly painted in various colour combinations for ready identification. Some fishermen fish two or three traps from each buoy, whereas others prefer a trawl of ten to fifteen traps fastened to a heavy ground line. Most fishermen build their own traps between fishing seasons. A trap fully rigged with rope, buoy, and ballast costs from $2.50 to $7.00, depending on its size, materials used and depth of water fished.

The traps are baited with readily available fresh or salt fish which are skewered whole on the bait spindle or placed in mesh bait bags or wooden bait boxes. Herring, gaspereau, flounders, cod, and mackerel are popular baits but each fisherman has his own ideas as to the best bait for his particular area. Weather permitting, the traps are normally hauled, baited, and reset each day. The number of traps set by each boat varies greatly from place to place. Along certain sections of the coast 200 traps are considered a large fleet of gear but in other areas 400 traps are only a moderate fleet. A few boats fish as many as 800 traps. Each year Canadian fishermen set a total of two million traps.

As each trap is hauled the lobsters are removed and those obviously below legal size or those carrying eggs are released at a glance. At a convenient moment the lobsters of doubtful size are carefully checked with a brass gauge and those found to be short are liberated. In some areas the legal-sized lobsters are divided into two categories — the "canners", about seven to nine inches long which are canned or prepared as chilled, fresh lobster meat, and the "markets", over nine inches long that are shipped to market alive. In the Bay of Fundy, southern Nova Scotia, parts of Cape Breton Island, and Newfoundland all sizes below the market category are released. As soon as convenient, the claws of the markets are plugged with small wooden or plastic plugs to keep them from damaging each other. As the lobsters are caught, they are placed in wooden crates and protected as much as possible from sun, rain or wind. In severe winter weather, they are often put in a tub of salt water to keep them from freezing.

The smallest lobsters are caught in the southern Gulf of St. Lawrence where in some areas legal-sized lobsters average only eight inches in length and five-eighths of a pound in weight. In southern Nova Scotia lobsters average about ten inches and 1¼ pounds. Lobsters run largest in the upper Bay of Fundy where in some places they average thirteen inches and three pounds. Fishermen to-day seldom catch lobsters over sixteen inches in length, weighing five to six pounds but now and then the odd specimen weighing up to twenty-five pounds is taken. The important factors in determining the sizes of lobsters caught in the southern Gulf of St. Lawrence are an abundance of young lobsters, a fishery so intensive that few escape to grow large, a small size limit, and the use of traps designed to catch small lobsters.

In the best producing areas the high boat will catch up to 25,000 pounds in a good year but this is unusual. The general average for a fleet of boats is considerably less than half this amount. Almost anywhere along the coast a season's catch of 10,000 pounds is considered good fishing and in some sections the catches are much smaller. In the best areas at the beginning of the season a few boats catch about 1,000 pounds in a day. Under exceptional conditions a boat will catch up to 2,000 pounds in a day but such events are rare. Daily catches usually fall off to 100 pounds or less towards the end of the season.

The price a fisherman receives depends not only on the supply and demand, both of which vary seasonally, but also on the sizes he catches. The usual price range for the smaller canner lobsters is twenty to forty cents a pound, whereas the market lobsters bring from thirty to as high as eighty cents during late winter or early spring when the catch is small.

### Distribution and Marketing

During the early stages of the fishery most of the catch was taken in the summer when the newly moulted lobsters trapped readily in the warm waters, and ideal fishing weather prevailed. However, the soft-shelled lobsters died quickly in the warm weather and facilities for holding and transporting them alive were poor. The only method of handling the large quantities that were landed in such a short period was to preserve the bulk of the catch in hermetically sealed cans. Gradually over the years methods and facilities for holding and transporting lobsters alive were improved and expanded. The adoption of various closed seasons distributed the catch more evenly throughout the year and increased the proportion of hard-shelled lobsters. These factors together with the extension of minimum size limits to all lobster-producing areas have led to an expansion of the live lobster trade and a corresponding decline in the canning industry. A relatively new but rapidly growing development is the preparation of chilled and frozen lobster meat. In recent years about two-thirds of the catch have been marketed alive with about equal parts of the remainder canned or processed as chilled meat.

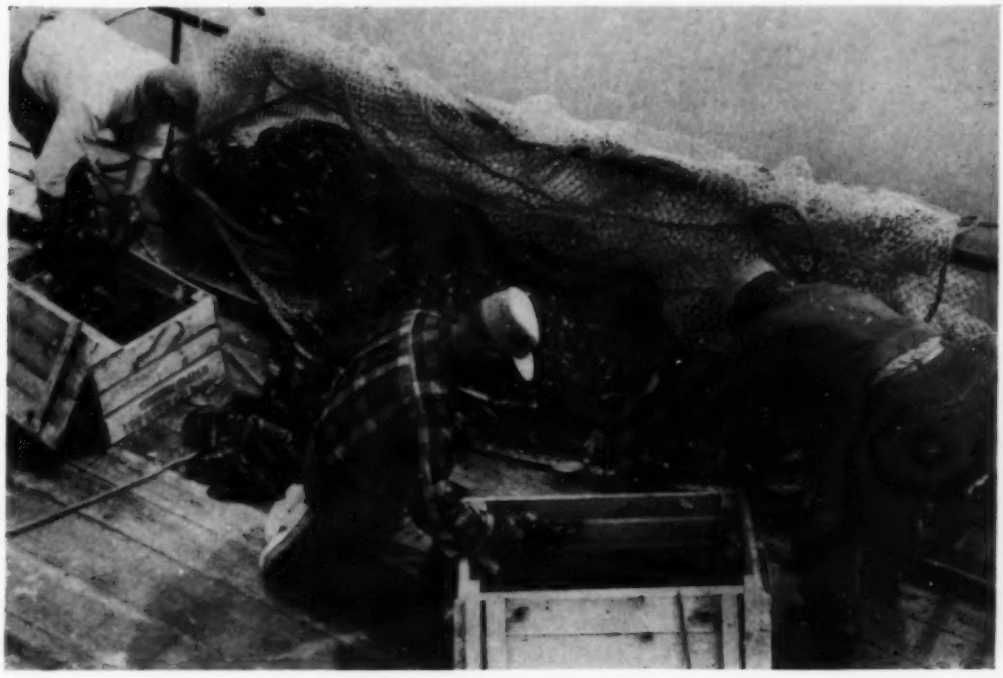
*A well-equipped fisherman uses his pot-hauler to hoist the heavy lobster traps to the wharf. These traps weigh over 100 pounds each.*

Market lobsters are often held alive at the point of landing for varying lengths of time. The essential requirements for satisfactory holding are cool, undiluted sea water, and sufficient water circulation through the crowded holding units to replenish the oxygen consumed by the lobsters. For short periods lobsters may be moored in lines of floating wooden slat crates each of which holds about 100 pounds. For periods up to several weeks lobsters are often held in floating lobster cars. These square or rectangular wooden box-like structures. 20 feet or more long and wide, and 3 to 6 feet deep are divided into a number of compartments. The sides of the car are made of wire mesh or wooden slats properly spaced to provided adequate water circulation. Several hundred pounds of lobsters are allowed to move about freely in each compartment; the total capacity of a car is several thousand pounds. Some cars are fitted with wire mesh trays which hold a single layer of lobsters and fit one above the other in each compartment. These reduce the danger of overcrowding and make it easier to check the condition of the lobsters. Lobsters are also held in indoor tanks supplied with running sea water. Each of the relatively shallow wooden tanks holds about 1,000 pounds of lobsters. With such tanks the lobsters can be kept under close observation and are readily graded for size and condition. One of the largest Canadian tank units has a capacity of over 150,000 pounds. If lobsters are to be held for several months, they are often placed in a tidal pound — an enclosure usually formed by damming off a natural cove. In Canada true lobster pounds are largely restricted to the Bay of Fundy where extreme tides provide good circulation of cool water throughout the pound. In such pounds lobsters are fed at regular intervals and are free to move around under almost natural conditions. The world's largest lobster pound, located on Deer Island, Charlotte County, New Brunswick, is more than one-third of a mile long and over 100 yards wide. Its capacity is about half a million pounds of lobsters during the summer months and somewhat more during the winter. By withholding lobsters when the catch is large and selling when the supply from the fishery is low these pounds and other holding units play an important part in stabilizing the industry.

Lobsters are shipped to market alive in trucks, trains, boats and aeroplanes. Bulk lots are often shipped in ordinary lobster crates in refrigerated compartments. Smaller shipments direct to hotels and restaurants are usually packed in specially designed double compartment boxes. About fifty pounds of lobsters are placed in the central compartment, protected above and below with a layer of moist seaweed which acts as a cushion and helps to keep them damp. This inner compartment is then closed and the outer compartment filled with crushed ice. This keeps the lobsters moist and cool but avoids the harmful effects of freshwater drip from the melting ice. With such careful packaging, top quality lobsters are shipped each day by train to the Pacific coast. Modern methods of handling and transportation are opening up an extensive inland market for live lobsters. The growth of this market has been coupled with the development of inland storage and display units with capacities from fifty to several hundred pounds of lobsters. Such units were a natural outcome of the discovery that lobsters will live in artificial sea water — a simple inexpensive mixture of five common salts added in the proper proportions to ordinary tap water. By refrigerating, aerating, and filtering the artificial sea water, it is possible to provide almost ideal holding conditions thousands of miles from the sea.

### Management

The annual crop of lobsters that an area is capable of producing depends on the number of young lobsters that settle on the area, how fast they grow and how well they survive. These factors are greatly affected by the physical, chemical and biological features of the ocean — the environment in which the lobster lives. To a large extent the temperature of the water determines how fast lobsters grow and when they mature. Chemicals dissolved in the water provide the nutrient materials on which the lobster's food supply depends. Biological features such as food, predators, parasites and disease affect both growth and survival rates. Knowledge as to how lobster populations are affected by their environment may enable us to



*Lobster pound operators use a large drag to remove lobsters from pound.*

explain some of the changes that have occurred in the catch and predict similar changes in the future. However, our lobster stocks occupy thousands of square miles of open coastal waters. At present the prospects seem rather remote that the production of lobsters can be increased by improving their vast environment or controlling the natural changes that occur there.

From the time young lobsters reach catchable size the contribution they make to the catch is determined to a very large extent by the fishery itself. The sizes caught, the proportion of the stock that is taken each year, and the condition of the lobsters when landed all play an important part in determining the volume and value of the catch. Unlike the lobster's environment, all these things are subject to control. The problem, therefore, is how to manage the fishery to make best continuing use of the lobster stocks that are produced naturally.

### Fishing Seasons

As early as 1874 a regulation was passed which prohibited fishing during July and August. This was to prevent the sale of lobsters during the moulting season when, because of their soft shells and watery meats, they are in poor condition for marketing. As time went on, fishing seasons were gradually shortened in an effort to reduce the amount of fishing and arrest the steady decline in landings. At present there are fourteen different lobster fishing seasons. West of Halifax fishing is permitted for six to seven months, principally during the winter and spring. East of Halifax, the fishing seasons are open for two to three months, chiefly in the spring of the year.

Closed seasons have definitely improved the quality of lobsters landed. In Canada over half the catch is landed in May and June when, as a general rule, the lobsters are hard-shelled and full-meated. In Maine, where fishing is permitted throughout the year, over sixty per cent of the catch is landed from July to October, during or shortly after the moulting period. Less than twenty per cent of the Canadian catch is landed in this four-month period.

The value of closed seasons as a conservation measure is, however, open to serious question. Evidence based on recaptures of tagged lobsters, the sizes caught and the decline in landings during the season shows that lobsters are fished as hard in the short seasons as they are in the six-to-seven-month seasons. The fishery has simply adjusted to the shorter period by employing more men, boats, and gear to harvest the crop more quickly.

Where fishermen can harvest their crop of lobsters in two to three months they may be wise to do so. Such a short season reduces some of the costs of fishing and gives the fishermen

an opportunity to catch other fish or turn to other occupations during the remainder of the year. Seasons can be arranged to ensure that lobsters are landed in good condition, to take advantage of favourable prices, and to facilitate processing and marketing. Such seasons are, however, difficult and costly to enforce. Fishermen who have fished in their home territory, say in May and June, are naturally tempted to fish a nearby area where the lobsters have been left undisturbed until an August-September season. To discourage this practice, additional regulations restrict fishermen, boats, and gear to one lobster fishing district in any one year. These regulations save the lobsters for local fishermen but restrict the fishermen's freedom and necessitate the building of more boats and gear than would otherwise be needed.

Closed seasons have their advantages and disadvantages but in assessing them, it should be remembered that they apparently have little, if any, real conservation value. The simplest compromise between year-round fishing and our present difficult, rather complicated system appears to be a single closed season during July, August, and September to restrict the sale of newly-moulted, soft-shelled lobsters. If this season were adopted, lobster fishing in the Bay of Fundy and southern Nova Scotia would be possible throughout the remainder of the year. East of Halifax, weather and ice conditions would probably limit fishing to four or five months in the fall and spring.

**Protection of Berried Females**

At spawning time most species of fish deposit their eggs on the bottom or release them freely in the water. Many of our commercial fisheries are based on migrations or concentrations of spawning fish. In contrast, the female lobster fastens her eggs to the swimmerets on the underside of the abdomen where they remain until they hatch about a year later. The sale of these egg-bearing or "berried" lobsters has been prohibited in Canada since 1873. This regulation has the whole-hearted support of a great majority of the fishermen.

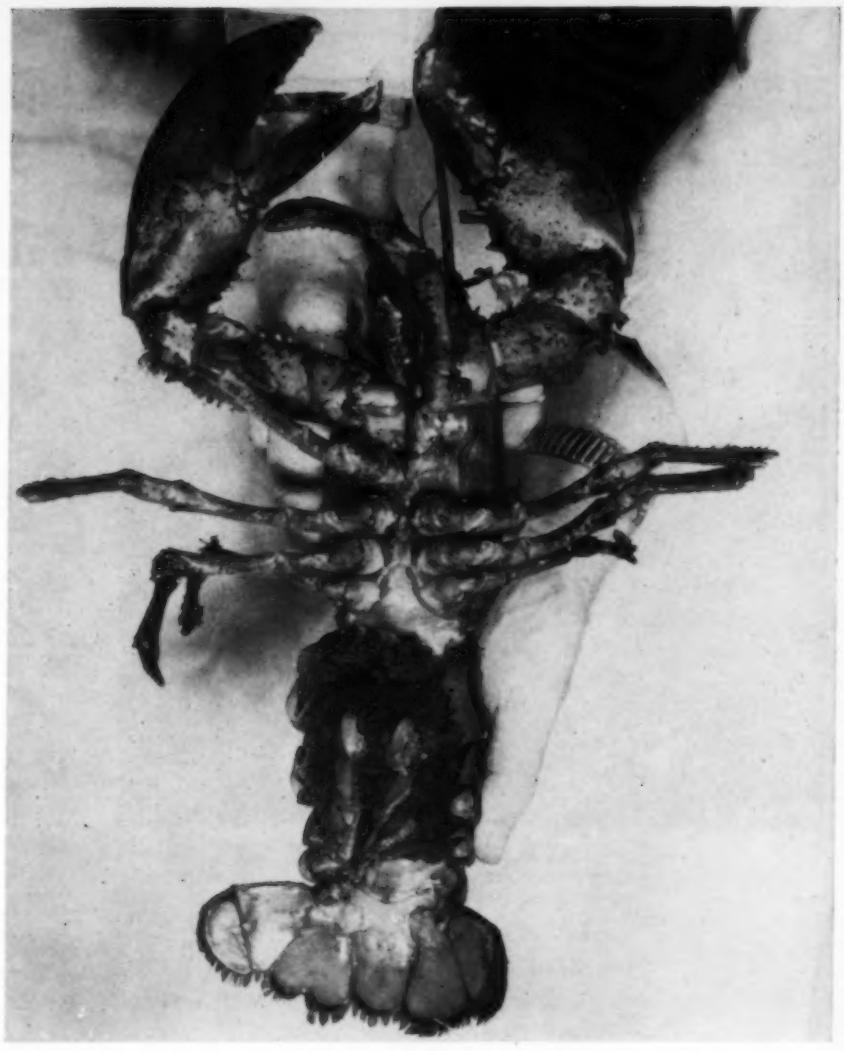
In areas where the lobsters are late maturing and the fishery is intensive, few escape to reach maturity. The resulting scarcity of berried females, eggs and newly-hatched lobsters may play an important part in limiting the commercial production. Under these circumstances, the few females that reach maturity warrant special protection while they are carrying eggs.

In other areas lobsters mature much earlier and berried females, eggs and newly-hatched lobsters are abundant. In such areas far more young lobsters are hatched out than the grounds could possibly rear. In one of these areas newly-hatched lobsters have been studied throughout their free-swimming period each summer for the past nine years. On the average only about five per cent of the young survive this one-to-two-month period but some years the survival is much better than others. In a good year, fourth stage lobsters may be 40 times as plentiful as they are in a poor year. So far no clear relationship has been found between the numbers that hatch and those that settle to the bottom. Some years the hatch is good and the settlement poor — other years just the reverse. Commercial production in such areas is more likely to be determined by the conditions the newly-hatched lobsters encounter rather than by the actual number hatched.

Protection of berried females to permit as large a hatch as possible is, however, an inexpensive form of insurance. Since mature females carry eggs every other year, the berried lobsters that are released one year are not a permanent loss to the fishermen. They can be taken the next year without eggs at larger, more valuable sizes. It is clear, however, that protection of berried females alone will not guarantee the best commercial production from an area. Lobsters should not be harvested until they have reached the sizes that will yield the most valuable crop.

**Size Limits to Protect Young**

In many areas fishermen can quite consistently catch some lobsters as small as four to five inches in length and one to two ounces in weight. Such small lobsters are unsuitable for the live lobster trade and are of questionable value to the canning industry because of their low meat yield. Although the value of protecting small lobsters has long been recognized, early attempts to do so were largely failures. With lobsters abundant few fishermen believed



*Egg-bearing or "berried" lobster. The eggs are fastened to the swimmerets, remaining there until they are hatched.*

that such protection was necessary or profitable. Gradually, however, as landings declined fishermen became more conscious of the need for proper management. By 1900, minimum size limits to protect small lobsters were reasonably well observed in the Bay of Fundy. In southern Nova Scotia the first serious effort to protect small lobsters was made in 1932 when the sale of lobsters under nine inches was prohibited. In the lobster canning areas east of Halifax a six and a half inch size limit was introduced in 1940.

With a size limit some of the small lobsters that are released live and grow and are caught again — others die from various natural causes and are a loss to the fishery. Basically size limits are justified if those that survive gain enough in weight to more than make up for the loss of those that die. If, as is usually the case with lobsters, larger ones are worth more per pound there is an added advantage in allowing them to grow. Size limits also allow more lobsters to reach spawning size and so increase the hatch. The harder a stock is fished the greater the benefits from a size limit are likely to be.

To determine their natural growth rate over 40,000 lobsters were carefully measured and marked by means of small holes punched in the tail fan. They were then released on various fishing grounds. By carefully re-measuring those that were recaptured up to a year later, it was possible to determine how much they had grown. These studies have shown that a high proportion of the smaller lobsters in the five-to-ten-inch length range moult twice a year and more than double their weight. Virtually all lobsters in this range moult at least once a year to gain fifty per cent in weight. The rate at which these sizes die from natural causes is more difficult to determine. The best estimate, based mainly on recaptures of tagged and marked lobsters indicates that eighty to ninety per cent of the small lobsters released will survive. Since lobsters are not migratory, fishermen who release small ones stand an excellent chance of catching the magain when they have

*The author measuring a lobster. Size limits are based on the length of the rigid shield, or carapace, covering the body.* Canada Wide Feature Service

grown fifty per cent or more in weight. The available evidence on growth and survival argues strongly in favour of size limits.

From the fishermen's point of view their actual landings provide the most convincing argument in favour of size limits. Wherever size limits have been introduced and properly observed the value of the catch has increased so markedly that most fishermen in such areas are convinced of the wisdom of protecting small, fast-growing lobsters.

The size limits now in effect are based on the length of the rigid shield or carapace covering the "body" which can be measured more quickly and accurately than the total length. In the market lobster areas of the Bay of Fundy, southern Nova Scotia, Newfoundland, and parts of Cape Breton Island the present size limit is three and three-sixteenths inches, equivalent to a total length of slightly more than nine inches and a weight of 15 ounces. Our size limit for market lobsters is to a large extent controlled by regulations in the New England States which prohibit the importation of live lobsters smaller than the size limits in effect there. In the lobster canning areas of the three Maritime Provinces the present size limit is two and a half inches (seven and a quarter inches total length, seven ounces). In Quebec the size limit has been gradually raised over the past few years and is now three inches.

Since the size, abundance and growth rate of lobsters vary considerably from place to place one size limit is not equally acceptable or effective for all areas. It is, however, impractical to establish different size limits for each more or less separate stock of lobsters. Some compromise is necessary. The present size limit in the southern Gulf of St. Lawrence is too small for certain sections but is as large as fishermen in the smallest-lobster areas are prepared to accept. One of the most important problems in the management of the fishery is to determine the best size limits for each major section of our coast.

### Other Considerations

Other management procedures have been attempted and many suggested. Extensive experiments showed that traps with the laths properly spaced would permit the escape of a high proportion of the small lobsters without reducing the marketable catch. To reduce unnecessary injury and loss of small lobsters associated with their capture, regulations specifying minimum lath spaces were in effect for several years. These regulations which proved unpopular in certain areas and difficult to enforce were recently rescinded. Many fishermen, however, continue to space their laths voluntarily.

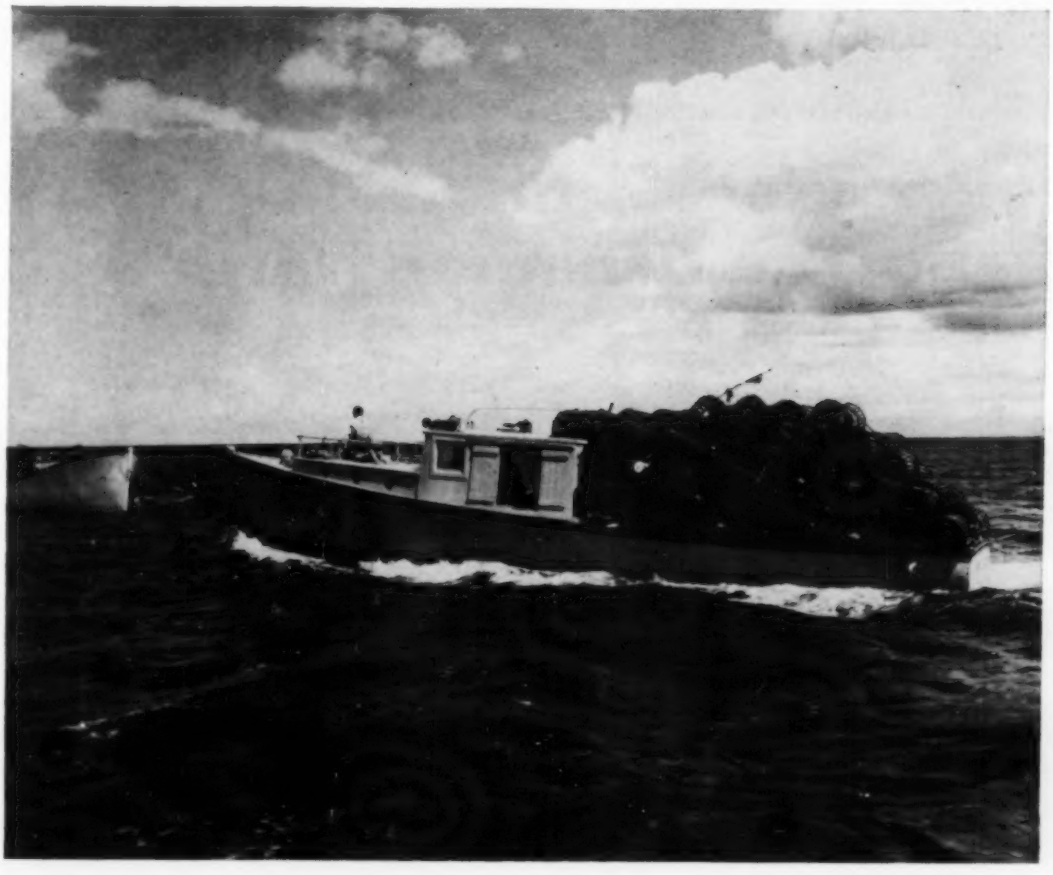
Maximum size limits to protect large breeding lobsters have been suggested many times. This proposal is based on the natural assumption that a greater production of newly-hatched lobsters would lead to increased commercial landings. As yet, however, it has not been possible to demonstrate any clear relationship between the hatch and subsequent commercial production. A large, protected population of old, slow-growing lobsters could, through competition and cannibalism, have serious effects on the growth and survival of the smaller lobsters. It is quite possible that these adverse effects would more than offset any possible gain that might result from greater egg production.

Short fishing seasons lead to a keen race

among the fishermen, each fishing as many traps as he can in order to catch as big a share of the lobsters as possible in the few weeks available. This practice may benefit a few individual fishermen but in many areas it appears that far more traps are being fished than are actually needed. Many fishermen feel that if the number of traps were restricted by regulation the costs of fishing would be reduced and the net profit increased. A few small groups of fishermen have in fact agreed to a gear limit on a voluntary basis. Without the full support of a large majority of the fishermen, it would be virtually impossible to enforce regulations limiting the number of traps. There is also the rather difficult question as to how much an individual fisherman's energy and enterprise should be curtailed by law. However, a regulation limiting each boat to 300 traps has recently been adopted in Quebec. The effects of this regulation are being followed with interest.

Commercial landings of lobsters have varied from year to year in the past and undoubtedly will continue to vary in the future. Periods of abundance and scarcity are to a large extent determined by changes in the lobster's environment, over which man has little control. Unusually high lobster landings in recent years have been associated with above normal water temperatures during the past decade. There are indications that a downward trend in temperatures has started. If temperatures fall and remain below normal for a period of years, we should anticipate a decline in landings. Such natural changes in abundance are inevitable. If, however, we are to make best use of the stocks that are produced naturally we must, through continued research, develop the best management procedures. Since effective management is possible only with the full co-operation of the fishermen, they must be given the opportunity to acquire a thorough understanding of the problems involved.

*On the grounds, ready to start setting the traps. Distinctive buoys indicate ownership of traps.*



# The Soviet North and The Canadian North

*by* O. FISHER

DURING the last year or two Canadians have become increasingly aware of the Soviet Union and in particular there has been much comparison between Russia's North and our own. Such interest is only natural, since Canada and the Soviet Union are the largest owners of arctic real estate. In this article an attempt will be made to show briefly and in very general terms why development in the northlands of the Soviet Union has proceeded on somewhat different lines from our own. For the purpose of this article "the north" is considered to be that area which lies north of contiguous settlement.

### Climate

In winter the north of both Canada and the Soviet Union is cold and, while the Russians claim the world's coldest locality, the temperatures encountered in the Yukon are of much the same order. The only exception to the general picture here is the Canadian west coast, which we do not normally consider to be part of our northland. January temperatures in

*At top:—The future of Canada's north is said to lie in the development of mineral resources. The uranium mine of Eldorado Mining and Refining Limited at Port Radium in the Northwest Territories.* N.F.B.

European Russia are also much less severe than those at comparable latitudes in Siberia or North America. Thus Leningrad, situated at the same latitude as Ungava Bay, has winter temperatures comparable to Ottawa or Montreal, and even at Arkhangelsk, at the head of Dvina Gulf on the White Sea, the mercury keeps in much the same range as it does in Quebec City. The port of Murmansk, farther west on Kola Bay on the Barents Sea, is open all year round. East of the White Sea and particularly in Siberia, the winter climate resembles that of our own north, being marked by very low temperatures and relatively little snow, except in mountainous regions.

In summer, however, there is a marked difference. The great continental land mass of Eurasia heats much more quickly than does our north. In particular the great ice-cellar of Hudson Bay keeps temperatures in north-eastern Canada low until late in the season. This discourages plant growth as well as the decomposition of plant matter and the formation of humus.

### Soils

A large area of north-eastern Canada is occupied by the Canadian Shield. This ancient geological structure is rich in minerals, but largely devoid of soils suited to agriculture; the only major commercial crop is pulpwood. West of the Great Lakes farming extends farther north and the most northerly area of land suited to large-scale agriculture is found in the Peace River country. In eastern Canada only a few small areas, where soils are such as to encourage farming, are found inside the boundaries of the Shield.

Soils in the Soviet Union are, on the whole, more favourable. In the extreme east and west conditions are not too good, but the large central area is mostly well drained and quite suited to the raising of crops. The difference between the soils of the Canadian northland and those of the northern Soviet Union is largely the result of their Pleistocene history. All of Canada was covered with ice which scraped many parts clear of soil, while glaciation in what is now the Soviet Union was very much less severe.

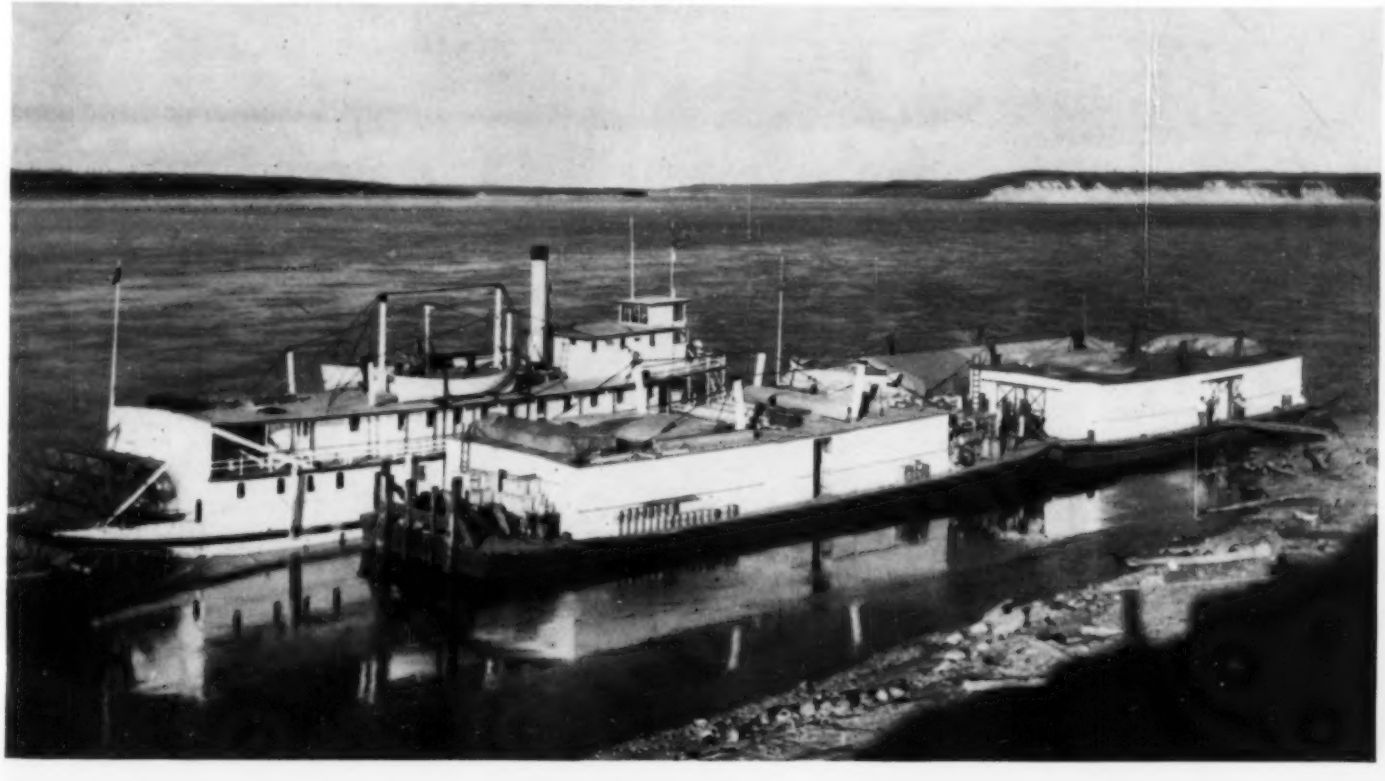
Permafrost underlies most of our northland, as it does that of the Soviet Union, although some of the extreme west and north-west of Russia is free of permanently frozen ground.

### Vegetation

The extent and type of plant growth is largely the result of climate and soil. Many conifers will withstand extremely low tempera-

*The Mackenzie River and some of its tributaries constitute the only major river system in North America which drains north and is suitable for navigation. A stern-wheeler with laden barges on the river above Great Slave Lake.*

World News Service.



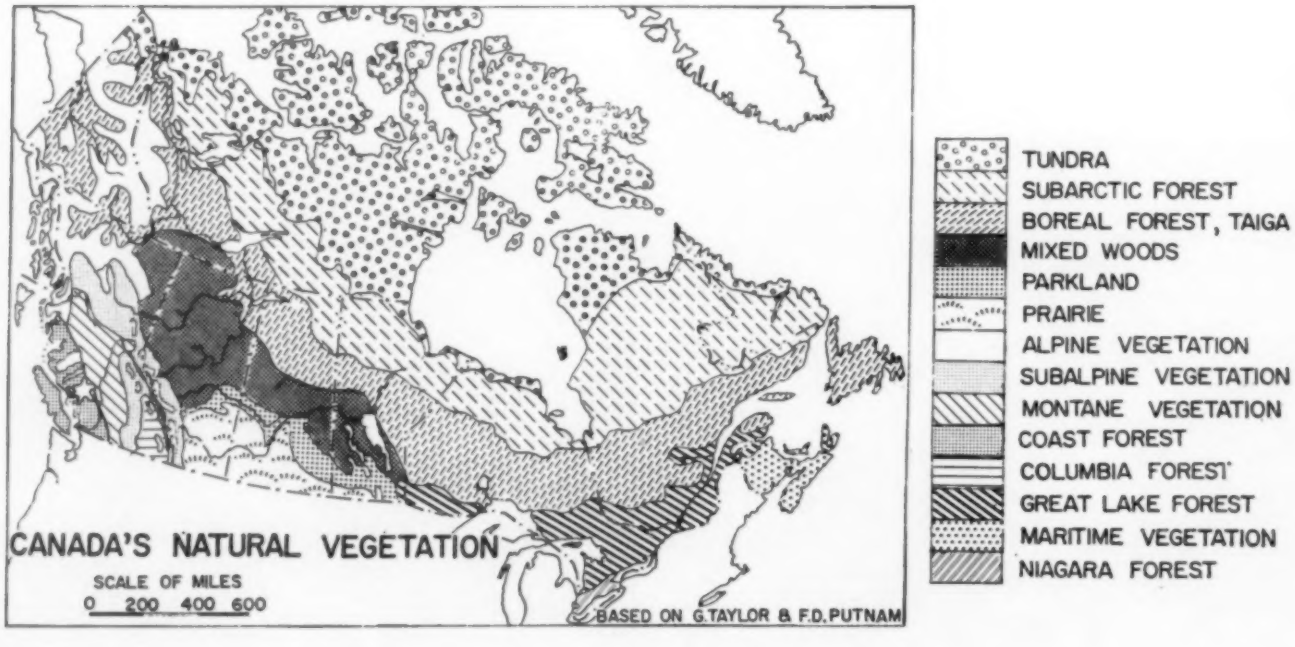
tures in winter, but they require several months of reasonably warm weather in summer to grow satisfactorily. For the cultivation of annuals, such as vegetables, the length and warmth of the summer growing season determines survival. The northern limit of tree growth is therefore nearly entirely determined by the length of time during which growth is possible in summer. Conditions in the Soviet Union are in general a good deal more favourable than in Canada. Our tree-line crosses Labrador and northern Quebec, then runs southward to James Bay and from there north-west through Churchill towards the mouth of the Mackenzie River. In the extreme north-west of Russia the forest reaches to the coast and east of the White Sea the tree-line runs generally parallel to the coast within a distance of 100 to 300 miles, except in the Taymyr Peninsula, which juts far north into the Arctic Ocean. Thus Soviet territory is covered by forests up to about the 70th parallel, while the tree-line in eastern Canada dips to the 55th.

North of the tree-line is the tundra, a land covered by sparse vegetation. Permanently frozen ground is close to the surface, so that despite little precipitation the land is wet in summer, because the water cannot run off. Only in exceptionally well-drained areas can such land produce any crops, even of the most limited kind.

This tundra area is less extensive in the Soviet Union than in North America and conditions in north-western Russia are similar to those found in parts of Ontario and southern Quebec. It is therefore not astonishing that the forests are rather alike in these two areas which possess similar climates. In the Soviet Union this relatively favourable climate extends to the shores of the Arctic Ocean in the extreme west, which makes the operation of wood-working plants and paper-mills possible. As one goes east economically useful timber is not found quite as far north, but the warm summers and better soils still make for good growth at latitudes where no trees are found in eastern North America.

In the past, fur-bearing animals were one of the main-stays of the economy of the northland, both here and in the Soviet Union. North of the tree-line the arctic fox is found, but most valuable fur-bearing animals remain in the forest and here the Soviet Union's greater forested area provides ampler hunting grounds at higher latitudes.

In areas where the forest is cleared, the land is frequently suitable for agriculture. In the European part of the Soviet Union the relatively warm climate allows the cultivation of crops similar to those grown in Quebec, and even in the Murmansk area sufficient livestock is raised to support the needs of the local population. In northern Siberia, where the growing period is short, the long warm summer days and relatively good soil are suitable for spring wheat and barley at very high latitudes. In



*The most northerly of Canada's Experimental Farms is at Fort Simpson, Northwest Territories. Harvesting a test crop.*

N.F.B.

general, agricultural conditions there are comparable to those of the Peace River country. Horticulture is encouraged everywhere to satisfy local needs, and cabbages, cucumbers and even melons are reported to ripen. Systematic efforts have also been made over the last thirty years to produce varieties of fruits suited to northern locations. Apple trees, in particular, are said to be doing well; these are trained to grow close to the ground so that they are covered by snow in winter and protected from extreme cold.

**Waterways and Drainage**

Anybody who is even slightly familiar with Canadian history knows of the role played by rivers and lakes in the development of this country. The St. Lawrence Seaway project is a vivid proof of the importance of our inland waterways today, and many lesser rivers and streams are of vital importance to the logging industry. In the Maritimes, coastal navigation was the chief means of transport until the beginning of this century, and still is in Newfoundland and on the West Coast.

Most of Ontario and Quebec drain into the Atlantic Ocean through the St. Lawrence River and its tributaries. The rivers which flow into Hudson Bay, such as the Nelson and Churchill, are fast-flowing and abound in rapids, which makes them unsuited to extensive navigation. The Saskatchewan River, however, is navigable (and this proved of importance in opening up the west), but it drains into Lake Winnipeg and thence through the Nelson into Hudson Bay. The only major North American river system which drains north and is suited to navigation is that of the Mackenzie and some if its tributaries, though even this system has several difficult stretches.

The drainage pattern of the Soviet Union differs considerably from ours. While in the north-west rivers are not generally navigable to any great extent, in Siberia they are mostly very long, deep and slow-flowing. They run north and drain about sixty per cent of the Soviet Union. Only fifteen per cent of the country's rivers drain into other oceans. (The balance is inland drainage, chiefly into the Caspian and Aral Seas.) Most of the rivers that flow into the Arctic Ocean are navigable, some

*Aklavik—largest Canadian settlement above the Arctic Circle. In 1955 the government commenced the five-year project of moving the community from a poor site on the West Channel of the Mackenzie River to a better one on the East Channel. An aerial view of the new townsite in 1956.*

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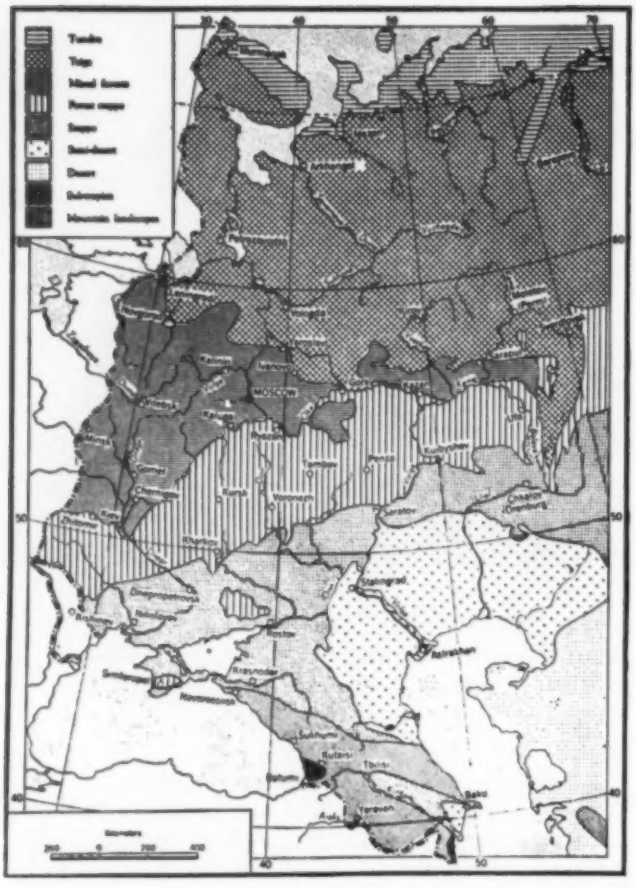


*Landscape zones of the European part of the Soviet Union.*

of them for well over 1,000 miles and they provide access to the interior of Siberia.

**Transport Routes**

One frequently hears that the 3,000-mile east-west dimension of Canada complicates its transport problem. The east-west extent of the Soviet Union is more than twice as great and the Russians do not have the advantage of being able to enter their continent by way of an east-west system of lakes and rivers. As the economy of Siberia grew, it became apparent that goods would have to travel down-river to the Arctic Ocean and then by water to reach world markets economically. Navigation along the Arctic coast presented formidable difficulties, and progress during the nineteenth century was slow. However, from the early voyages much was learned about the difficulties of sailing ships in heavy ice and valuable hydrographic information was gathered. By the end of World War I, when the Communists came to power, ships could be sailed with reasonable assurance of success to the mouths of the Ob

*Areas of permanent ground frost in the Soviet Union. (Balzak, Vasyutin and Feigin:* Economic Geography of the U.S.S.R.*)*

Maps reproduced with permission of the American Council of Learned Societies and the Macmillan Publishing Company.

and Yenisei, the two most westerly of the great rivers of Siberia. During the same period American ships undertook occasional voyages from Bering Strait to the Kolima River in eastern Siberia.

When Stalin decided about 1930 that Siberia should be exploited, a successful system of water transport was clearly a prerequisite as the Trans-Siberian Railway alone was not capable of carrying the necessary volume of traffic, and the cost and difficulty of constructing an adequate overland transport system over such long distances would have been prohibitive. During the decade that preceded the Soviet Union's entry into World War II, the Russians embarked on an extensive program of research and development, which resulted in the creation of the now famous Northern Sea Route. Along it ships can sail from the Atlantic to the mouths of the great Siberian rivers and on eastward through Bering Strait into the Pacific. The Northern Sea Route provides an exit for the timber and other produce of Siberia, which is brought downriver to the Arctic Ocean; in return machinery and other goods are taken to Siberia. Soviet figures for cost of transportation are hard to obtain and even more difficult to evaluate, but the cost of transporting timber from Siberia to London by water was stated in 1927 to be less than half of that by the overland route. Apart from serving Siberia, the Northern Sea Route also provides a link between Europe and the Soviet coastal provinces on the Pacific. This is an alternative to the Trans-Siberian Railway and the long voyage through the Mediterranean and the Suez Canal.

The obvious drawback of the Northern Sea Route is that it can only be used for a short period each year, but even then ice may make for long delays, and heavy fogs are frequently encountered in summer. At present it is estimated that the entire route is open about two and one half months of the year, although navigation is possible for longer periods at either end. Sailing time along the route varies with its conditions. One of the fastest known journeys was accomplished in 1940, during the period of German-Soviet friendship, by the German raider *Komet*, which with extensive help from Soviet ice-breakers made the trip in twenty-one and one-half days, of which only fourteen were actual steaming time.

### Population

The Soviet north is in many respects more hospitable than ours; therefore it could support a larger native population. During the period when most European nations sought to establish colonies overseas, Russia moved eastward and carved out an empire for herself in Siberia. In order to assert her dominion over these regions, she sought to settle them. In the era when Britain sent her convicts to Australia the tsars sent theirs to Siberia. By the time the revolution came, there existed not only administrative and mining centres, but also pockets of ex-convict settlers, some of whom had intermarried with the natives.

The systematic opening up of Siberia under Soviet rule coincided with the mass arrests of the 1930s. How many were sent to Siberia a future historian working in the archives of the Kremlin may be able to tell us, but the many slave labourers built mines and roads and cleared the forest, thus initiating a great upswing in the economy of the north. Simultaneously free labour came in as supervisors, technicians and so forth. Some of them were ordered to go, since even free labour is subject to extensive direction in the Soviet Union. Others went because they were attracted by the higher pay and pensions offered for service in the north and others again were drawn to the Arctic in search of adventure or in the pursuit of scientific exploration. Farming, mining and lumber communities grew up in the interior. Along the shores of the Arctic Ocean ports were developed to handle the produce moving north on the rivers and along the Northern Sea Route, which in turn required extensive navigational, meteorological and coaling facilities.

### Trade and Industry

One of the early motives for sending administrators and colonists to Siberia was to assert Russian dominion there. At that time the chief economic value of the north lay in the vast harvest of furs it produced. During the

*Street in Syktyvkar, capital of Komi Republic, about 62° north latitude — the same latitude as Yellowknife.*
UNESCO.

nineteenth century gold mining began to increase and the export of agricultural produce, chiefly grain and butter, became important, as did the timber trade. Fishing in the Barents Sea also increased. During World War I the port of Murmansk was greatly improved, since its ice-free location in the north was useful in maintaining communication with the Allies as an alternative to the Baltic. The railway which links Murmansk with Leningrad stems from that time.

During the last thirty years Soviet policy has been directed at maximum industrial growth of the country, irrespective of cost. In order to achieve this, raw materials had to be obtained from the north. Stalin put it this way: "The Arctic and our northern regions have colossal wealth. We must create a Soviet organization which can make this wealth available to our general resources in the shortest possible time." Coal, iron ore, phosphate, non-ferrous metal and salt mines were brought into production and agriculture and lumbering vastly expanded, bringing secondary industries in their wakes. The fishing industry of the north increased and canning plants were built. With the extension of navigation and metallurgical enterprises came shipbuilding and other industries, particularly in the west.

One factor which made this development possible was the availability of ample human resources. The pre-war population of the Soviet Union was 170 million, but the present figure is 200 million and many of these people are used to life in a cold climate. The standard of living of convict labour need not be discussed: even that of free Russians is much below that which would be accepted by North Americans and most Europeans. Large numbers of people, therefore, could be sent north and be expected to function adequately under adverse and primitive conditions. But, even given the

*The city of Norilsk, not far from the mouth of the Yenisei River in West Siberia. It lies at about 69° north latitude — roughly the same as that of Aklavik in Canada.*
UNESCO.

*Murmansk, one of the Soviet Union's most important northern ports, is open all year. It lies on Kola Bay, about twenty-two miles from the Arctic Ocean. Waterfront scene.*

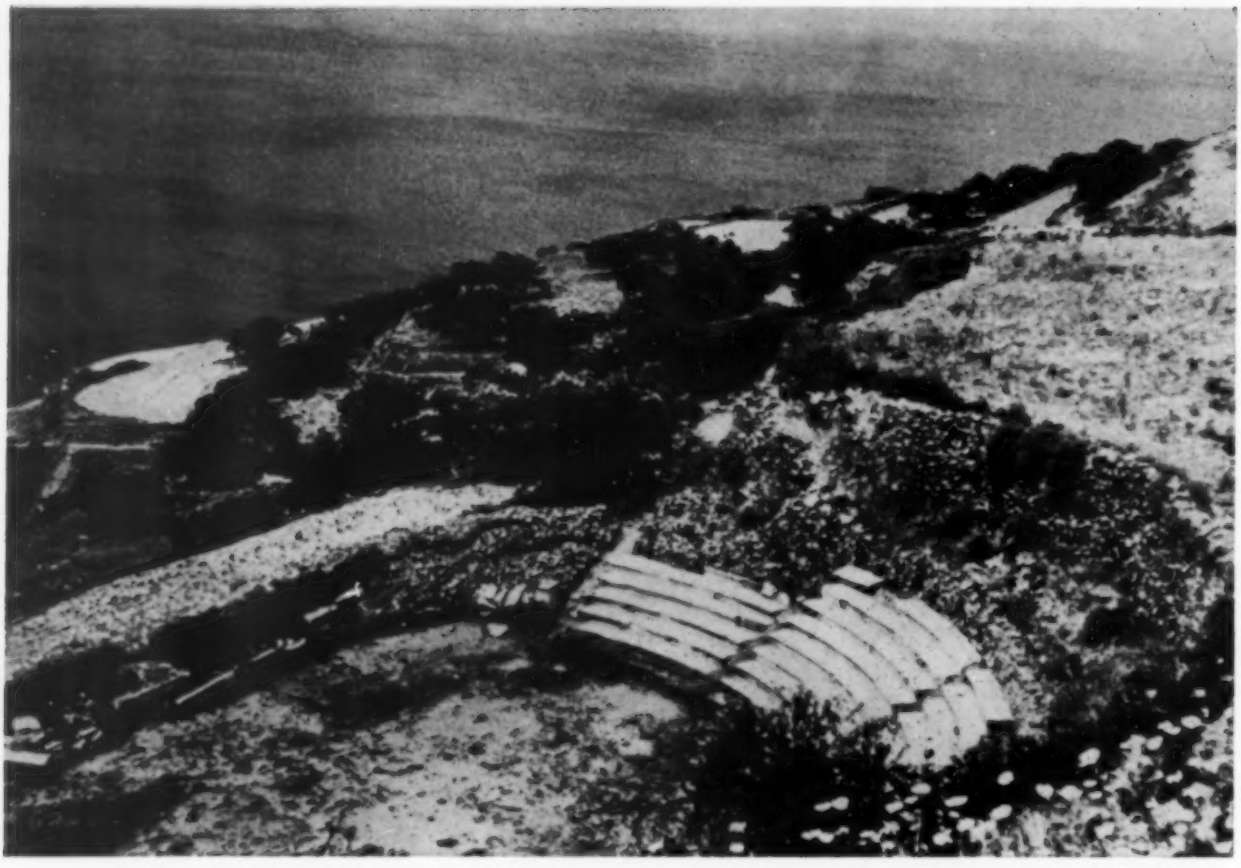
UNESCO.

cheapest labour, it is questionable whether the scale of Soviet operations would have been economically advisable by western standards. Soviet planners, on the other hand, intent only on building "the motherland of socialism" look at these things differently, and as long as the strength of the state is augmented, the cost to a generation is considered unimportant.

### The Future

It can be assumed that Soviet expansion in the north will go on. The Soviet Union continues to be engaged in an enormous program of exploration and scientific research, which is aimed at improving the operation of the Northern Sea Route, and an atomic ice-breaker is to go into service in 1958. Geological prospecting is proceeding on a large scale, and from now on the economic returns from past investments should become increasingly visible. As mechanization frees people in the established industrial and agricultural areas, they can be and are directed to the north and east. Continued growth of the Soviet Union will be accompanied by considerable further increases in activity in the Soviet north.

There will certainly also be more activity in Canada's north. How fast or how extensive this increase will be must remain a matter of conjecture. The nature of our soil and climate limit the possibilities of agricultural growth mainly to the west, except for horticulture to supply local needs. Even where agricultural growth is possible, it will depend largely on markets and prices. The mining industry is likely to spread farther north to satisfy the world hunger for metals. If technological advances, such as atomic power, should make more extensive processing at the mine site economically attractive, secondary industries may follow. However, unless Canada's population increases very considerably, it is unlikely that a large part of our people will live in the north. In recent years defence demands, and particularly the DEW Line, have caused many more ships to sail the arctic sea routes. However, unless mineral riches or oil bring them to these waters, we cannot expect to see much shipping for commercial purposes, except possibly into Hudson Bay. Fortunately our geography is such that we do not need a Northern Sea Route.



*A view of the Island of Melos or Milo, where the famous statue of Venus was discovered in 1820.*

# The Cyclades Islands

*by* J. A. S. EVANS

Photographs by the author

THERE WAS a muscular young fisherman on the beach, stripped to the waist, busy spreading out his nets. He glanced dourly at me, for I was staring at him curiously, and returned his attention to his nets. I tried raising my hand in a salute, and smiled.

His face suddenly transformed, and he waved back.

"You are a foreigner." The words in Greek, *xenos isthe*, were not a question; I was wearing an international costume of American-made dungarees, Greek shoes and a pull-over made in Britain, and no one could have mistaken me for a native Greek. "Where are you from?"

"From Canada."

The young fisherman was not quite sure where Canada was. That was a common enough reaction in Greece outside of the capital city of Athens itself, but sometimes a rheumy-eyed shepherd or a peasant woman would tell me that a son or cousin was in Montreal. But generally the English-speaking tourists are to be subdivided into the American and English varieties, and the fisherman decided to classify me as the former.

He took me by the arm and asked me if I would have coffee. We went to a little coffee-shop on the other side of the road which skirted the beach and sat down together.

The Aegean Sea stretched out before us, with a sky over it which must surely have been a more brilliant blue than anywhere else in the world, and in the distance were the indistinct outlines of other islands of the Cyclades.

The archipelago of the Cyclades, "the islands in a circle", which lie south and east of Athens,

are only now being discovered by the tourist. To be sure, they were always well known. Delos, in their centre, is the place where the ancient Greeks believed Apollo was born and you may still see the ruins of the great pagan sanctuary there, although the island is deserted now. Paros is the place where much of the marble which built the great temples of the classical world was quarried. The quarries are still used; although when I visited them, they were idle, without any orders on hand.

The most spectacular of all the islands is at the very south of the archipelago. It is a volcanic island — or rather, what remains of one large volcano, for Santorin is part of the rim of a crater nearly surrounding a deep bay, where the volcano still rumbles and spews up cinders from under the water. About three thousand years ago it was one large island inhabited by a people who left traces of prehistoric settlements dating back to 1800 B.C. Then the volcano exploded; its rim was ripped away and the sea rushed into the crater and formed the bay which is now the harbour of Santorin. But the volcano was not yet dead. It erupted again, more than once, and one of these eruptions St. John the Divine, writing the *Book of Revelation* on the Island of Patmos, may have seen lighting the western sky, and incorporated in the imagery of his apocalypse. But that is conjecture. The volcano is still alive at Santorin; the last eruption was only last summer.

Our boat entered the harbour of Santorin in the early morning. A soft light illuminated the burnt walls of the old crater. Near the pier was a freighter taking on a cargo of pumice-stone and a yacht stood out at anchor in the bay. Later we learned that it belonged to an aged South African couple who were sailing around the world and thought this island worth stopping to visit. Our anchor went down with a clatter of chain, and several pairs of hands caught our hawser and tied us to the pier.

The precipice rose over six hundred feet above us, and perched on top of the precipice was the town, with whitewashed houses and churches with sparkling white bell-towers. The path from the port to the town above is a zig-zag, cobble-stoned road, snaking back and forth across the face of the precipice, which you may negotiate on a mule or on foot as you wish; but there is no other way.

The town of Thira stands on the very ridge of the old crater. On one side is the precipice and the harbour underneath; on the other the land slopes gently down to the sea: a panorama of vineyards, fields of tomatoes and wheat stretching down to a magnificent beach of black volcanic ash.

I stopped to admire a huge geranium.

"What a wonderful flower." My Greek limited me to trite expressions but the owner of the geranium did not seem to mind. She took me by the arm and drew me into the courtyard of a little house, where there was another great tree of a geranium, which made the one I had admired look like a dwarf.

"How do you grow them so large ?" I wanted to know.

*Stone lions dating from the sixth century B.C. line the Sacred Way on the Island of Delos, legendary birthplace of Apollo.*

*The cathedral of the* Panayia Evanghelistria *on the Island of Tinos, where a miraculous ikon credited with healing the diseases of many pious pilgrims is kept.*

*Shafts of sunlight fall into a narrow back street of Mykonos, deserted during the afternoon siesta hours. The village is on the island of the same name in the north-east Cyclades.*

"They just grow", she replied, and picked a flower for me. I put it in my hat, and continued on my way.

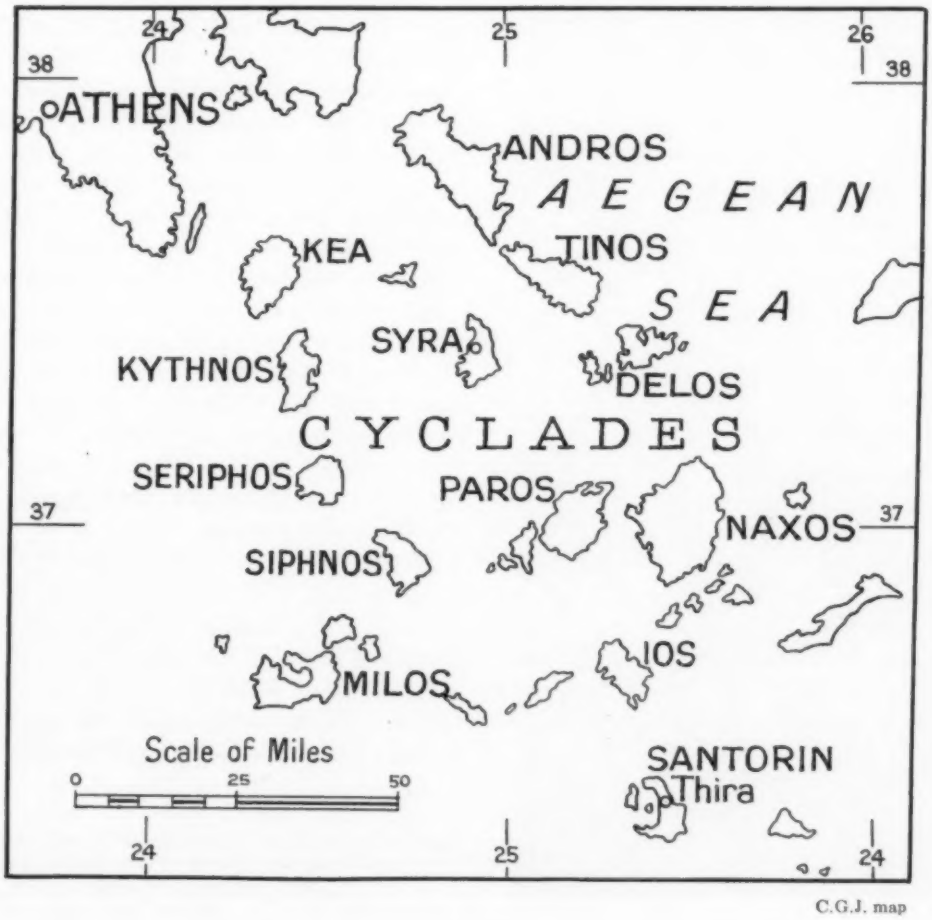
But the geranium in my hat snow-balled. Another woman popped up with a shy word of greeting and another flower for my hat. Then another. Soon there was a whole flock of women and children with flowers and my procession along the path became something like a circus parade with all the trimmings.

The road ended at last, and I wandered into a little *taverna* to rest. The proprietress brought me a letter which some previous tourist had written to tell her how much he had enjoyed his visit to Santorin. It was in English, and she did not understand a word of it, but she was mightily proud of the letter nevertheless.

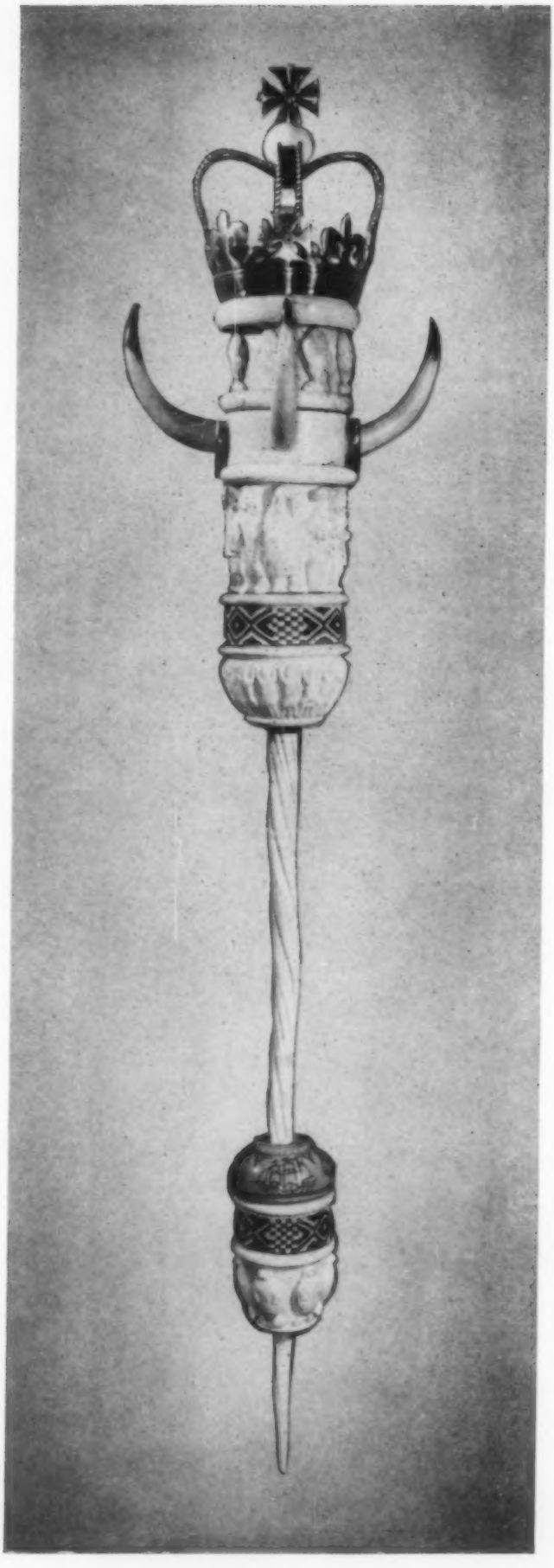
Tinos, perhaps the most famous of the Cyclades nowadays, is the shrine of the modern Greek world, just as Delos was the shrine of the ancient world. Twice a year, on 25 March and 15 August, there are great religious feasts held there which draw pilgrims from all parts of Greece and from the colonies of Greeks in Egypt and the Near East. It is a Mecca especially for the sick and the maimed, who seek the help of a miraculous ikon discovered over a hundred years ago, which is treasured now in the great cathedral of *Panayia Evanghelistria*.

The dazzling white cathedral and its adjoining buildings dominate the town of Tinos which nestles close to the port. When the festivals are held, the courtyard surrounding the church is packed with worshippers; but when I was there, there were only school children playing in it. The interior of the church was incredibly rich with votive offerings, and the sacred ikon, which was reverently displayed to me, was buried in jewels.

It is — for one must tell the truth — not always easy to wander from island to island in the Cyclades, and accommodation for tourists varies in quality. Steamers from Athens call at some of the islands. To reach others you must hire a fishing vessel. But it would be no hardship to be stranded for a week on an island of the Cyclades. A rather enviable fate, in fact.




C.G.J. map



# Anoutoaloak—
# *The Mace of the Northwest Territories*

*by* IRENE BAIRD

No SYMBOL of the authority and presence of parliamentary government reflects the life and land of its people with greater fidelity than *anoutoaloak*, the mace of the Northwest Territories.

The mace is more than the re-creation of a historic emblem, more even than a tribute to the craftsman's instinct of Eskimos at Cape Dorset who shaped, carved, and perfected this likeness of an object they had never seen. The mace of the Northwest Territories is a thing created out of the north itself. From the cross surmounting the perfect whalebone orb on the Edward Crown to the discs of gold from the three great gold mines of the Yellowknife district, and the porcupine quillwork woven by the skilled fingers of an Indian woman, the mace is a product of its environment.

Nothing was brought into the north to contribute towards its making. The two materials not of the land originally each had long weathering there. One was a piece of oak carved with the outlines of the ship H.M.S. *Fury*, when under the command of Sir William Edward Parry. She was wrecked off Fury Point, Somerset Island, in 1824, while searching for the Northwest Passage.

The second exotic material was the copper kettle of Udluriak, married daughter of Peter Pitsulak, who offered it to meet a crisis which developed when an accident befell a carefully prepared piece of native copper. This kettle, however, was not a thing hurriedly sent for and brought into the north. It was a prized heirloom

***The Eskimos of the Eastern Arctic who made the mace called it* anoutoaloak, *meaning big club.***
Dept. of Northern Affairs and National Resources

belonging to the mother of Udluriak, left behind by two families of Lapp reindeer herders who visited South Baffin Island in 1921. So, in a true sense, the kettle was of the country, too — a part of the life of the household of Udluriak.

The mace was commissioned by the Governor-General, His Excellency the Right Honourable Vincent Massey, C.H., in the summer of 1955, as a gift to the Council of the Northwest Territories and to the people of the Territories. It was presented by His Excellency to Gordon Robertson, Commissioner of the Northwest Territories and Deputy Minister of Northern Affairs and National Resources, at a ceremony held at Government House in January 1956 while the Council was in winter session.

The Governor-General had requested that the work be carried out by Eskimos and that — within the traditional framework — it follow their own concepts of design and be created out of native materials. The first sketches were made in Ottawa and much essential information, particularly relating to the Edward Crown which surmounts the mace, was supplied by Allan Beddoe, noted Canadian authority on heraldry.

Work was begun in July 1955 under the direction of James Houston of the Department of Northern Affairs and National Resources. "Upon arrival", Houston wrote later, "we met with Pitsulak, a splendid organizer and craftsman, and Oshaweetuk, an artist and carver of great merit, and discussed the project. They agreed to divide the work, each handling the problems to which his talents were best suited." Each then chose three men to help him — Lukta, Kovinaktiliak, Nuyukshawetuk, Tauki, Kavuvawak, Ashevak — and later a young man, also called Kovinaktiliak, to help with the polishing. The old man Kingwachiak took no part in the carving but "visited the carvers daily for the purpose of singing old Eskimo songs in a fine strong voice which greatly cheered the carvers and lightened their painstaking efforts."

With little more than three weeks to create an object so totally unfamiliar to the people of the Arctic, the task was formidable. Details of the native motif were intricate and had to be carefully considered. Materials were in limited supply, crude in their raw state, and sometimes brittle; Cape Dorset offered few reserves to draw on. But, when any problem rose that called for a choice between the simplest solution, and the one most satisfying to a creative imagination, the Eskimos never hesitated. And in the end their innate resourcefulness and response to challenge always produced a way.

When, for example, the work had reached the stage where the next thing to be made was the fine twisted beading on the arches of the crown, a perfectly reasonable solution would have been to dispense with this as too intricate to make with available materials. The Eskimos pondered the problem; it was hard, perhaps even beyond solution. But this was a way out satisfying to no one, so they thought again. Finally someone went away and returned with a length of insulated wire once used on an old wind-charger. Stripping away the insulation, they polished, twisted, and attached this to the arches, creating precisely the effect desired.

The most troublesome and elaborate detail of the mace was the crown. An eighty-pound block of native copper was brought to Cape Dorset and pounded into sheets with rocks and a small sledge-hammer. These sheets, cut out and hammered into shape, were used as dies. When the crown was finished — gleaming copper circlet, crosses, fleurs-de-lis, graceful arches, beading — one of the projections broke off. Here was a crisis! For by then Pitsulak and his workers had used up all their copper. It was at this point that Udluriak offered her kettle and saved the day. His Excellency, when he heard of this later, had a new copper kettle sent to her.

Each detail of the design was chosen to create a strong unity between traditional symbol and Arctic form. The perfectly rounded sphere of the orb, made by Kovinaktiliak without calipers or dividers, guided only by his keen hunter's eye, is of whalebone left on the shores of South Baffin Island by Scottish whaling crews a century ago. Below the crown is a circle of carved bowhead whales — Eskimo symbol of royalty and greatness — and curving out below that are four musk-ox horns found on the tundra of Ellesmere Island. At first these horns did not match and long hours of patient

*His Excellency the Right Honourable Vincent Massey, C.H., with R. Gordon Robertson, Commissioner of the Northwest Territories (right) and J. A. Houston of the Arctic Division, Department of Northern Affairs and National Resources (centre), examines the detail of the Edward Crown.*

N.F.B

scraping and polishing were needed to match them.

When the mace was finished, friends and neighbours of the workers crowded in to wonder at and admire this strange masterpiece of which there was no prototype in the north. The faces of the carvers, still powdered with rock dust, shone with pleasure at the knowledge that their difficult and rewarding task had not only been accomplished, but finished on time.

The mace stands five and one-half feet high and weighs thirty-five pounds, a delicate balance to maintain as by far the greatest proportion of the weight is concentrated in the upper half. The staff is of narwhal horn, the ferocious spiral tusk of the white whale or "sea unicorne" — as one chronicler dubbed it when he sighted his first narwhal while sailing with Sir Martin Frobisher in 1576 on his second north-western voyage. As their ship entered what is now Frobisher Bay, he wrote, "On the west shoare we found a dead fishe floating whiche had in his nose a horn straight and torquet (twisted) in lengthe two yardes lacking two inches . . . " Five years later Frobisher was displaying narwhal tusks in England to prove that "sea unicornes" were among the wonders of the New World. The narwhal is among traditional Arctic symbols carved on the mace, with the polar bear, wolf, caribou and walrus. So, too, are those most true and well-loved figures of the Eskimo carver — hunter, mother and child.

At first, with their flair for the expressive word, the Eskimos called the mysterious thing they were making *pingwarktuk* or plaything. But as its lines took shape and its symbolism was explained to them, they changed the word to *anoutoaloak* or big club. Again their instinct for the right word was sound — historically so. For this same big club, or mace, proved so popular in mediaeval Britain that Edward the Third, noting with displeasure how many private citizens were laying about them without regard to the rules of war, proscribed the use of maces by the public at large.

In time the mace evolved largely into an object of ceremony. It is not clear when it was first introduced into the House of Commons in London. Nevertheless, during the reigns of Edward the Third and Richard the Second maces were in hot water again. Parliament was complaining about the growing use of silver maces by civic bodies on ceremonial occasions. The first reference to the mace in Parliament is said to have occurred in the reign of Elizabeth the First when the Speaker, Sir Thomas Cargrove, is described as departing "with the other members of the House of Commons to their own House, the Sergeant of the same carrying the mace all the way before the said Speaker."

Use of the mace at sessions of the Council of the Northwest Territories follows the traditional procedure of the House of Commons in Ottawa. The Commissioner's procession forms in a room adjoining the Council chamber. It is

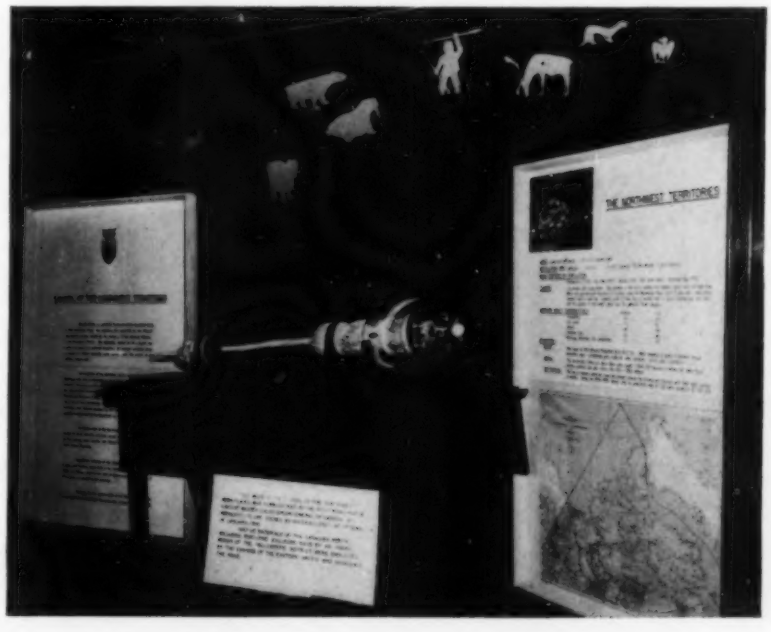
headed by a scarlet-coated Royal Canadian Mounted Police constable, bearing the mace on his right shoulder, followed by the Commissioner and lastly by the secretary. As the Commissioner reaches his chair he turns, facing the Council, and the mace-bearer lays the mace on the table with its head facing to the Commissioner's right. When Council resolves into committee and the Commissioner leaves his chair, the mace-bearer lowers the mace to brackets below table-top level. At adjournment time the procession reforms.

When the Council goes north for the summer session, the mace accompanies it, packed in a wooden container expertly designed at the Forest Products Laboratories to protect it from the strains of transit. Two features of the mace posed special problems for the designers — the concentration of weight at one end and the component parts which, though appearing rugged and sturdy, are actually fragile. Then, too, the enclosure of Arctic whalebone and other materials in heated interiors farther south had a tendency to make them brittle at first. Surely Pitsulak and Oshaweetuk would have been happy to see the skill with which their fellow Canadians in the laboratories worked on the problem and developed solutions.

When the Council met at East Three, the site of new Aklavik, in the summer of 1956, the mace was put on display for a day at the old town. People in Yellowknife, too, had an opportunity to see it. In the summer of 1957 it accompanied members of the Council to Frobisher Bay, South Baffin Island, some 400 air miles east of its original home.

By now the mace has become more than a name, more even than a picture, to many Canadians who can hardly have expected ever to see it. In the winter of 1956, by arrangement with provincial authorities, it was sent on a five-month coast-to-coast tour that extended from St. John's to Victoria. Wherever it was shown the provinces provided a handsome setting in their main legislative buildings. In Winnipeg it returned for an additional two weeks at the Historical Museum of the Hudson's Bay Company. In Montreal, too, it has appeared twice — as part of a major display of Eskimo art at the Canadian Handicrafts Guild and with an exhibit on the Arctic arranged by the Department of Northern Affairs and National Resources at the request of the *Salon de la Jeunesse*.

To scores of school children across Canada, among the most frequent and welcome visitors wherever it is shown, this strikingly handsome piece of workmanship has served to make the complex business of governing the Northwest Territories a shade less abstract and remote. What stirs the imagination is not a colourful story, nor yet a rare example of fine craftsmanship, but that the mace, like the Eskimos who made it, is a part of the north.



*The mace on display in the Legislative Building at Edmonton. It has been shown publicly in various cities from coast to coast in Canada.*
Alberta Government photograph

# The Elusive Island of Busse

by THOMAS DUNBABIN

On MAY 13TH, 1675, King Charles II of England issued a charter assigning to the Hudson's Bay Company, "All that Island called the Busse Island lying between the fifty seaven and fifty nyne Degrees of Northerne Latitude or thereaboutes and the sole trade and commerce of all the Seas Bayes Islettes Rivers Creekes and Sounds whatsoever lying within neare or about the said Island with the fishing of all sortes of Fish . . . as well as all manner of Mines of Gold, Silver, Gems discovered or to be discovered."

Busse Island had been first discovered in 1578 when Martin Frobisher on his third voyage of discovery took fifteen ships to Baffin Land, hoping to load them up with gold ore. One of these ships, the *Emmanuel*, was a cargo vessel of the type known as a busse, and an account of the discovery she made on her homeward voyage was published by the great Elizabethan geographer, Richard Hakluyt from a narrative supplied by an eye-witness, Thomas Wiars. He relates that the *Emmanuel*, having completed her cargo, sailed from Baffin Land on 3rd September, and sighted the coast of Greenland on 8th September. Sailing south-east by south with a fair wind, land was sighted on 12 September at a point which the Captain estimated to be 150 miles south of Greenland. This land remained in sight for a total of twenty-eight hours. The ship passed to the south of it, and the captain reckoned that its southern point was in latitude 57′.1″ north. Wiars stated that there were two harbours much beset with ice, and that ice was seen for many days afterwards.

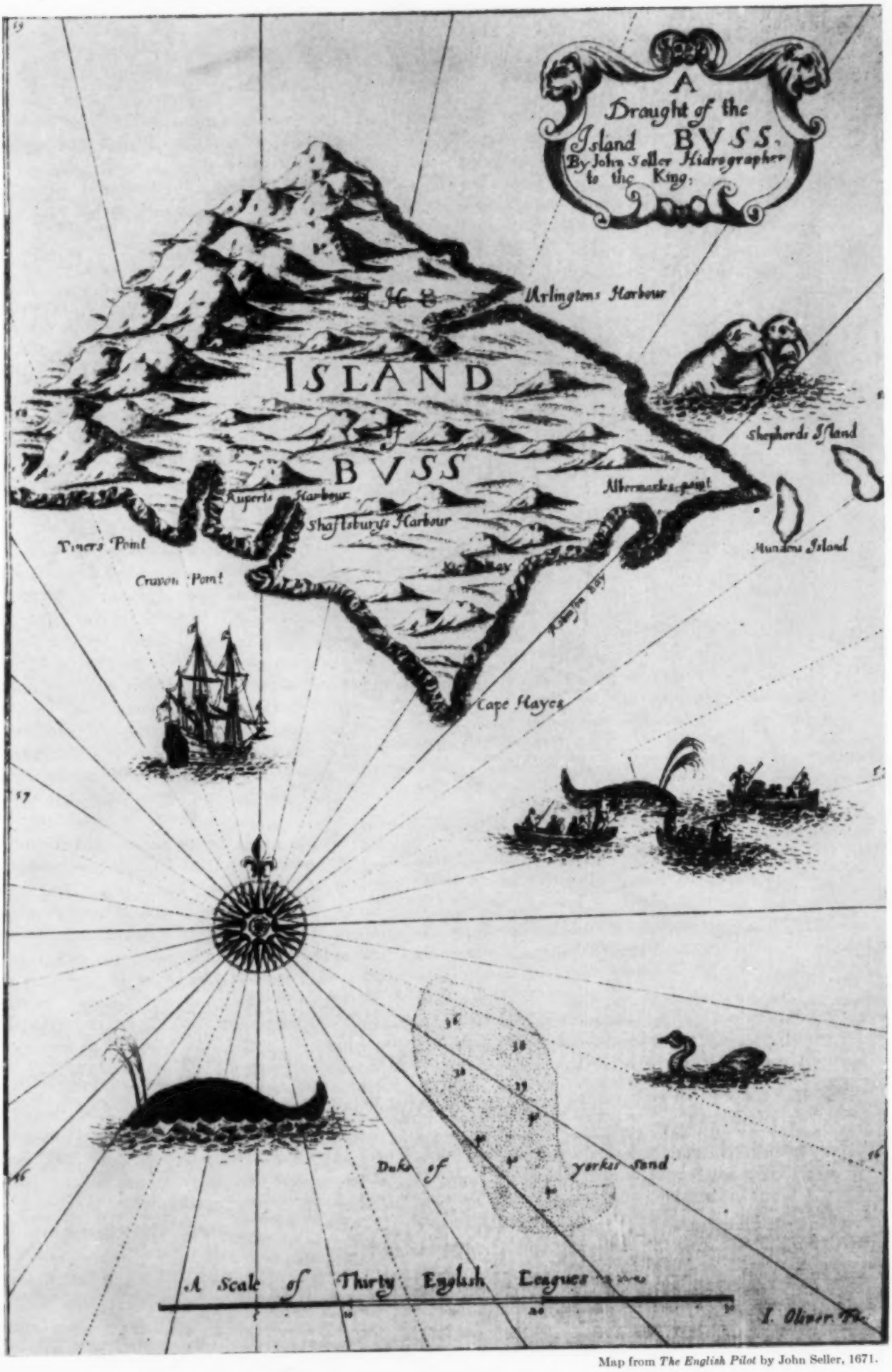
Hakluyt published a further account supplied by another member of Frobisher's expedition who was not aboard the *Emmanuel*. He placed the island at 57½′ north and added that "the land seemed to be fruitful and full of woods." It was very difficult for early navigators to reckon longitude with any degree of accuracy and Busse Island is shown variously at 32′ west and 27½′ west.

Busse was next sighted by James Hall sailing in the service of King Christian IV of Denmark. Writing in 1606 he says, "On the first of July we saw Land and, being eight leagues off, with a great bank of ice lying off Southwest . . . This land I did suppose to be Busse Island, it lying more to the westwards than it is placed on the Marine charts." The next great navigator to look for it was Henry Hudson. When he reached latitude 58′ 48″ north he recorded on 2 June 1609, "We accounted ourselves near Busse Island; at midnight we looked out for it but could not see it."

These chimerical references were not good enough for the Hudson's Bay Company which had paid £65 sterling for their charter of possession. A convincing picture of the island had appeared in *The English Pilot*, a work published about 1671 by John Seller, Hydrographer to the King, from evidence mostly supplied by

***The Emmanuel, one of the ships commanded by Martin Frobisher (shown here) in 1578, first reported the discovery of the Island of Busse.***

Reproduced from *Sir Martin Frobisher* by William McFee, John Lane, The Bodley Head Ltd., London.




Map from *The English Pilot* by John Seller, 1671.

Captain Thomas Shepard who had sailed into Hudson Bay on the first English fur trading voyage into the Bay in 1668. Three years later, when Shepard was master of the *Golden Lion* he claimed to have rediscovered the island, and Seller gives his report thus: "The said Captain Shepard . . . reports that the island affords great store of Whales easy to be struck, Seahorses, Seals and Codd in abundance, and supposes two voyages may be made in a year. The sea is clear of ice unless in September. The island is low and level to the southward and has some hills and mountains on the northwest." There is also a map showing the island to be 130 miles long with a maximum width of ninety miles, and it shows many natural features named after founders and directors of the Hudson's Bay Company. Other names appear on a map preserved amongst the Pepys papers at Magdalene College, Cambridge. The company did not intend their newly acquired property to lie idle; in 1676 they sent Captain James Golding in the *Prince Rupert* to investigate, and told Captain Shepard to visit the island while the *Prince Rupert* was there. No record has been preserved of any such doings, although the company cited the exploitation of Busse as one of their reasons for raising more capital in 1720. It is hardly surprising that after this the company allowed their interest in Busse to lapse. There is, however, in Toronto Public Library a sixty-four page manuscript, undated, but presumably written about 1770, denouncing the company for its obscurantist policy, and accusing it of concealing its knowledge of Busse Island for trade reasons.

The next document was published anonymously in 1782 under the title "A concise account of Voyages for the Discovery of the Northwest Passage". It is quite likely that this may have been written by Richard Pickersgill, who as captain of His Majesty's brig *Lion* was sent in 1776 to Davis Strait in order to protect British whalers from depredations by rebels from the American Colonies. Speaking of Busse Island, the text says, "I sounded when near it by computation, and make no doubt but that if I had time (as I had evident tokens of land) I might have discovered it. If it be again discovered it would probably prove preferable to Newfoundland for the fishery. Besides, our ships bound to the northward might winter there and it would prove a nursery for hardy seamen." The author obviously did not share the opinion put forward in 1745 by John van Keulen that the island had sunk beneath the waves and thus caused breakers which were a great danger to shipping.

By 1791 the British Government began to take a hand in the matter and wrote thus to Samuel Wegg, Governor of the Hudson's Bay Company: "Observing in the second charter of the Hudson's Bay Company a grant of Busse Island, I am to beg that you would be good enough to mention to me, for the information of the Lords of the Committee of Council of the Board of Trade, where Busse Island is placed on the map." The Governor was in no hurry to reply. The company had been fiercely criticized for its failure to explore the interior of Northern Canada, and its slackness in seeking the Northwest Passage. Later in the same year the Admiralty loaned Captain Charles Duncan, R.N., to the Hudson's Bay Company for the purpose of exploring the Northwest Passage, and on 8 September 1791, Duncan reported to the Governor and Committee: "I strove as much as the Winds would permit me to keep in the supposed Lattd. of the *supposed* Buss Island, but it is my firm opinion that no such Island is now above Water if ever it was."

There is one islet far out in the Atlantic which answers to the latitude assigned to Busse in the Hudson's Bay Charter, but it is far to the east of any longitude ever given to Busse. This is a mere pinpoint of rock arising out of the Atlantic for some seventy feet, about 250 miles west of the Outer Hebrides. It is known as Rockall and was annexed to the United Kingdom in 1955. There is very little evidence to support the theory that this rock is all that remains of the "sunken land of Busse."

The final appearance of Busse Island was on a map of the North Atlantic in an Atlas published by Keith Johnson in 1856, just 264 years after it had first been shown on the great Molyneux globe, in the reign of the first Elizabeth, in 1592.

## EDITOR'S NOTE-BOOK

Dr. D. G. Wilder (*Canada's Lobster Fishery*), a Principal Scientist with the Fisheries Research Board of Canada, is stationed at the Biological Station, St. Andrews, New Brunswick, where he is in charge of lobster investigation. His researches provided the basis for present fishery regulations designed to maintain lobster stocks at as high a level as possible. He was educated at Queen's University and the University of Toronto.

* * *

O. Fisher (*The Soviet North and the Canadian North*), who has been with the Defence Research Board of Canada since 1951, has a keen interest in various aspects of arctic research. He served with the Royal Air Force during the Second World War, then settled in Canada in 1948. Mr. Fisher is a graduate of Cambridge University, England.

* * *

J. A. S. Evans (*The Cyclades Islands*) is an instructor in the Classics Department of Waterloo College, Waterloo, Ontario. The material for his article was collected while he was in Greece on a fellowship of the American School of Classics at Athens.

* * *

Irene Baird (*Anoutoaloak: The Mace of the Northwest Territories*), a novelist and freelance writer, has contributed a number of interesting articles to the Journal. Since 1942 she has been in the federal government service. She is an information officer in the Department of Northern Affairs and National Resources.

* * *

Thomas Dunbabin (*The Elusive Island of Busse*) was formerly Press Attaché in the office of the High Commissioner of Australia in Ottawa. He is now the Canadian representative of the Consolidated Press of Sydney, New South Wales.

# THE TRAVEL CORNER

*View of Lake Champlain from the New York shore. The lake is more than 100 miles long and as much as twelve miles wide in places.*

N.Y. State Department of Commerce.

### Along Lake Champlain

Although a good many eastern Canadians have learned to know and love the upper part of New York State, there must be even more who have missed much if not most of it while travelling at high speed on the broad excellent thoroughfares to New York City itself. These well-groomed, efficient highways serve their purpose admirably, but there is still a good deal to be said for the older roads that go through towns instead of bypassing them and wind along valleys, among hills and up into the mountains. The roads in the Lake Champlain district are like that. They bring the traveller closer to nature and into towns of immaculate white frame houses with backgrounds of green and into more intimate contact with the Americans themselves.

From Quebec and Ontario the main avenues of approach to Lake Champlain are by way of Montreal, Cornwall and Prescott. It does not matter greatly which route is chosen: most of New York State's highways and secondary roads seem to be in good condition and few of the northern ones are ever congested with traffic. Travelling by way of Prescott, there is a refreshing ferry trip across the St. Lawrence River to Ogdensburg. Before long the level farmland of the river region rises into pleasantly rolling hills, then farther east climbs more steeply into the green wooded Adirondack Mountains. Driving south from Montreal to Rouse's Point at the head of Lake Champlain, motorists may take the highway along its west shore through Plattsburg and a string of small towns to Ticonderoga, where Lake Champlain joins Lake George. An interesting alternate route is that from Rouse's Point down Grand Isle and across by bridge to the east shore near Burlington, Vermont. There is a regular ferry service from there to Port Kent on the New York side. Or the drive might be extended farther south to Charlotte, Vermont, where another ferry carries vehicles and pedestrians across to Essex, a little resort town on the opposite shore.

Essex, which lies close to the midpoint on the New York side of the lake, besides being a very pleasant place, is a convenient point from which to explore the attractive surrounding resort communities. It lies on the curving shore with the Adirondacks behind it and a fine view of

*(Continued on page VIII)*

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**HOME LINES**

(*Continued from page VII*)

the Green Mountains of Vermont across the water — a small town, little more than a village, its neat houses set back among tall old shade-trees. Here and there stand a few more pretentious homes, some of them owned years ago by wealthy and powerful families when it was in its hey-day. In summer the busiest place is the Marina dock, where there are usually a dozen or so pleasure yachts moored, some for a few days, others for weeks at a time. Essex is not aggressive about the tourist business, but it does have several modest tourist homes and one hotel, Sherwood Inn, formerly the mansion of a wealthy family, which still seems more like a large private home than a commercial hotel. It has a tennis court, badminton court, horseshoe-pitch and a large dock for the use of guests. Fishermen find fair sport here — pike, bass and perch in the lake, trout in neighbouring streams.

Willsboro, a few miles to the north, is a larger town, with a colony of summer cottages on its outskirts. There is a golf course here, as well as at Westport, a more elaborate resort centre south of Essex. Probably the most popular excursions for those staying in the district are to the Ausable Chasm, Whiteface Mountain and Lake Placid. None is innocent of commercialism, but the scenery is delightful. However, Lake Placid's streets throng with tourists in informal attire. It is no longer the exclusive retreat of the wealthy that it once was, but a people's playground— a mixture of the cheap and gaudy, the expensive and conservative — with a large number of motels, souvenir shops and most of the usual facilities for diversion.

In the vicinity of Lake Champlain there are a number of interesting old forts that are open to the public. One of the largest of these is Fort Ticonderoga, down at the southern end of the lake. Beside the highways and in the towns numerous blue and yellow plaques mark historical sites. These capsule refresher courses in the past of the region often contain a surprising amount of information; if time is taken to examine them, they can add considerably to the interest of a motor-trip. Cows graze contentedly on what was once a military encampment. The empty windows of an early settler's log cabin stare like blind eyes at the speeding traffic. Yesterday is just around the corner, but today is already sliding into the past. The motorist may find himself reflecting, slowing down and looking about with a slightly different perspective.

### Free Teletype Service for Tour s

The Ottawa Tourist and Conve tion Bureau offers tourists arriving the Provincial Travel and Publici reception bureaus at Cornwall, P cott and the Thousand Islands Bri free teletype service for making r servations at hotels and motels in t Ottawa area. Travellers may al send teletype messages from Ottaw to the border points mentioned fo the same purpose.

### Accommodation for Brussels World's Fair, 1958

In Brussels, during the World Fair which opens in April 1958, the will be at least 42,000 beds availabl for tourists. Not far from the fa grounds an enormous motel, wit space for 4,000 persons and their au tomobiles, is under construction. A area near this is being prepared fo campers and trailer-owners; it wil accommodate 17,000 persons. Severa new hotels are being erected. Room in private homes will be offered fo rent also during the fair.

The fair will be held on the Heys plateau northwest of Brussels. Abou 175,000 visitors are expected to at tend it daily. Those planning to at tend would probably be wise to re serve accommodation in Brussels a soon as possible.

### Trans-Canada Airlines

Trans-Canada Airlines plan to pur chase thirteen more *Viscounts* and two more Douglas DC-8 turbo-jet airliners. When these are delivered, the airline will have fifty-one Vis counts and six DC-8s. (At present it has twenty-nine *Viscounts* in service.) The new *Viscounts* will be delivered between December 1957 and June 1958. Delivery of the other aircraft will commence late in 1959, and they will enter service in 1960 on long-distance routes, flying from Vancouver to Toronto in about four hours and from Montreal to London in about six hours (half the present scheduled flight time).

### Europabus Tours

Thirteen of Western Europe's transportation companies jointly operate a network of motorbus lines whose services extend from Norway's North Cape to Sicily. Through interchanges with its own lines and those of various railways, Europabus, as the organization calls itself, offers travellers extensive railway and motorbus tours through Norway, Sweden, Denmark, Great Britain, Holland, Belgium, Luxembourg, Germany, Austria, France, Italy, Switzerland and Spain. Some of these are the popular "package" type, including all expenses. Details may be obtained from travel bureaus.

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## AMONGST THE NEW BOOKS

### The Northern Trader

*by H. S. M. Kemp*

(The Ryerson Press, Toronto, $3.50)

Mr. H. S. M. Kemp has written a readable account of his trials and tribulations in northern Saskatchewan and Manitoba during the early years of this century. The book is full of rather personal accounts of experiences he or his family or his friends had while he worked as a trader. One of the more commendable aspects of the book is his treatment of the local Indian inhabitants, Crees and Chipewyans. These groups are presented as real people without prejudicial remarks or attitudes. This is a good descriptive account of a moment of Canadian history just before the period of great industrial expansion into the region.

Mr. Kemp, a long-time inhabitant of the area, presents the region with understanding and accuracy. The book is well worth reading as a historical account and as a warning against certain other accounts of the North, which often fall somewhere between real estate blurbs and pure fiction. RICHARD S. MACNEISH.

*Mr. Richard S. McNeish is Chief of the Division of Archaeology in the Human History Branch of the National Museum of Canada.*

* * *

### Rideau Waterway

*by Robert Leggett*

(University of Toronto Press, Toronto. $5.00)

The Rideau Canal is "a silver chain of rivers and lakes, linked by small locks and winding channels," which connects the cities of Kingston and Ottawa. Today the banks of the artificial channels are scarcely distinguishable from the natural ones, and the small pleasure craft which skim its tranquil waters do not suggest the busy steamer traffic that once operated there.

Robert Leggett's *Rideau Waterway* is a timely reminder that this was, in fact, the original St. Lawrence Seaway route from Montreal to Kingston. For two decades after the opening of the canal in 1832 commercial vessels would navigate the St. Lawrence only downstream from Kingston to Montreal. The return route was by way of Ottawa and the Rideau system. In 1845 a fleet of no less than thirty small steamboats regularly plied this triangular route, and one company alone operated thirteen "puffers".

One chapter of this book is almost a history in miniature of nineteenth


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century transportation. Journals, carefully maintained at all the locks, record the passage of Indian war canoes, the conveyance of British Army troops in barges or in Durham boats, and the paddle-wheelers towing as many as twenty-four barges, though admittedly this was exceptional.

The first "propelling barge" appears in 1840, inaugurating the busiest period on the canal. Traffic reached its peak about 1860, nine years after completion of the Junction Canal on the St. Lawrence between Cardinal and Iroquois. For years most of the coal for the C.P.R.'s important divisional point of Smiths Falls went by barge up the Rideau Canal. Increasing railway and road transport eventually replaced the waterway as a commercial carrier, and 100 years of passenger traffic ended with the last voyage of the *Ottawan* in 1935.

But the most important section of the book concerns the building of the canal, an achievement that ranks among the great engineering works of the last century. To build a waterway of 123 miles through virgin forests, fever-infested swamps, and uncharted rivers; to construct, without benefit of modern machinery and mainly from local material, forty-seven locks and many control dams, including masonry structures up to sixty feet in height: the work was gigantic in scope for its time.

Yet the project was completed within six years (1826-32) by Lieutenant-Colonel John By of the Royal Engineers, and the original work stands firmly today as a monument to this man's exceptional engineering skill and administrative ability. It seems incredible that an accident of history could rob Colonel By of the fame and honours that he so clearly deserved. Robert Leggett's tribute to John By's courage and character is long overdue.

*Rideau Waterway* concludes with a description of the canal today which will be of value to the tourists who in increasing numbers seek recreation in that area. The appendices carefully list works of reference, information about maps and charts, details of mileages, lifts and clearance, and even the dates of open fishing seasons.

W. R. JOYCE

*Mr. Wallace R. Joyce is engaged in actuarial work in Toronto. He served four years overseas as an officer of the First Canadian Survey Regiment and is interested in the development of the Canadian West and Northwest.*

* * *

### Off-Trail in Nova Scotia

*by Will R. Bird*

(Ryerson Press, Toronto, $4.00)

Dr. Bird, with an eye that is both penetrating and warmly sympathetic, offers to the reader of this latest book, *Off-Trail in Nova Scotia*, an incredible wealth of folk literature from his native province. As the end-papers show, he followed around the peninsula and Cape Breton Island by way of the less frequented roads that lead through many an old coastal town or village — most of them with sweet or pungent memories of days long gone, and some now passing with the charming old people who remained to be their last inhabitants. Conciseness and vigour of presentation give an extra fillip to cheery anecdotes of the communities Dr. Bird visited; there is a brisk, tangy sense of humour bubbling up constantly, yet unexpectedly, in that refreshing, sea-filled atmosphere of Nova Scotia.

(*Continued on page XII*)

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*(Continued from page XI)*

However, this is an occasional book, not intended to be read at one sitting (even though its text numbers only 307 pages), any more than one would think of hearing a singer of Maritimes ballads go through his entire repertoire of, say, 175 songs, in a single evening. *Off-Trail in Nova Scotia* is surely intended to be savoured now and then on suitable occasions, and more especially when one is drawn to these regions of which our authority speaks in such a deft, delightful way and with so much poetic insight.

Between pages 150 and 151 comes a series of excellent photographic reproductions, giving the clearest possible views of characteristic scenes and people in the places Dr. Bird describes. A two-page author's foreword engages the reader, at the very beginning, with the lure of this lovely land. To give us full measure of variety, the writer incorporates some hand-picked praises — lyrics and prose — into his narrative. There are, too, a summary of chapter headings, a list of illustrations, and a complete four-page index of geographical placenames, by whose aid the reader can instantly feel something of those little coastal towns he might like to see.

A. E. H. PETRIE

*Mr. A. E. H. Petrie is assistant head of the Prints and Drawings Division of the Public Archives of Canada.*

* * *

### Earth Science

**The World We Live In**

*by S. N. Namowitz and D. B. Stone; revised and adapted for Canada by J. Brian Bird*

(D. Van Nostrand Company (Canada) Limited, Toronto. $3.25)

This book, which was originally written by two high school teachers from New York State, is intended as a textbook on earth sciences for high schools. A Canadian edition has now been prepared by Professor Bird of McGill University. The book was first published in 1953 and the Canadian edition appeared three years later.

*Earth Science* is well written and well illustrated. It should provide an interesting introduction to the wonders of that science. Technical terms appear in italics and the pronunciation is given when the word or phrase is met for the first time.

One interesting feature provided by a Canadian edition of an American textbook is that examples are drawn from the Canadian scene where possible. It is always easier in teaching geography to be able to start from known things near at hand and work out towards unknown places. The chapter "Reading Topographic Maps" has been rewritten for the Canadian edition — certainly an advisable revision especially when the source of the maps is considered. An addition to the Canadian version is a chapter entitled "Physiographic Provinces of Canada".

Professor Bird unfortunately committed a few errors in his chapter on Physiographic Provinces. The Monashee Mountains lie to the west of the Selkirk Range and not to the north of them as is stated on page 197. The Fraser Plateau has elevations which exceed 6,000 feet, but 4,000 feet would be more representative of its general level. In addition to the three rivers mentioned in the text that break through the Coast Mountains, I would add the Homathko, Klinaklini, and Dean. Possibly some mention should have been made of the Cascade Range which forms the south-east portion of the Western Mountain System. This range occupies an area east of the Fraser River and south of the town of Lytton. Errors and omissions such as these, small though they may be, should not appear in a chapter on Canada written by a Canadian geographer.

The book would have been im-


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proved if there had been more maps similar to those appearing on pages 114 and 124. In the teaching of earth sciences there is something more needed than the description of a phenomenon. It is far more meaningful if the student knows the real distribution of phenomena, and the significance, if any, of their location with relation to other phenomena.

In general, this book should serve a useful purpose in providing a good textbook for use in the high schools of Canada. GORDON D. TAYLOR

* * *

**Artist At War**

*by Charles Fraser Comfort, R.C.A., O.S.A.*

(Ryerson Press, Toronto. $4.95)

Major Charles Comfort's pictorial records of Canadian soldiers in Italy and their battles have become widely known and admired through exhibition in our art galleries and reproduction in our war histories. In *Artist at War* he turns from brush to pen and puts us doubly in his debt with an illuminating commentary on his experiences as official war artist with the First Canadian Division.

In October 1943, after convoy passage from England, Comfort crossed from North Africa to the Italian heel in a storm-tossed infantry landing craft (which sat "on the surface like an empty shoe box") and caught up with the First Division in the Sannio Mountains east of Campobasso. For the next ten months he was to be part of the Division in its advance through Central Italy from the Biferno to the Arno, perpetuating on canvas the operations which the wearers of the Red Patch will ever proudly claim as battle honours. Throughout he shared the experiences of the fighting soldier. He knew the discomfort of excessive heat and dust, the misery of raw cold and mud. Frequently his sketching was done under enemy fire.

But unlike the average soldier Charles Comfort viewed his environment with an eye trained to observe detail and a mind sensitive to comprehend the significance of what he saw. More than that (a thing not general among artists), he had the gift of a facile pen with which to record his impressions in vivid words. He analyzes the terrific impact upon the human system of an artillery bombardment. "Our frayed nerves were as taut as zither strings, twanging in wild dissonance in response to the unreal violence of the night. We were conscious of blood pulsing heavily through arteries and veins, the heart thumping in the breast like

(*Continued on page XIV*)


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(*Continued from page XIII*)

a separate entity, detached and independent of one's body, enduring its own struggle, the eardrums hammered by a thousand percussionists." What a blessed contrast to listen to the voice of a cuckoo calling from the dark woods of the Biferno Valley. He watches high-flying enemy reconnaissance aircraft "with long vapour trails streaming behind like bridal veils, and surrounded with the deadly confetti of ack-ack"; and turns to contemplate a lizard basking on a stone in the warm December sun, "still, like ourselves, except for the rapid pulsing of his soft belly".

He describes the sheer horror and utter devastation of Cassino, whose formless heap of calcined stone resembled "some imagined landscape on the moon. It had ceased to be terrestrial, it was like some lidless, blind eye, glaring back at the sun with empty, lifeless inertia". Ortona after the battle is a "grotesque and malignant forest of ruins . . . leaning, tottering crazily, reeking with the malodorous stench of death". The great Cathedral of San Tommaso looks "as if a mighty cleaver had struck through the dome and split it in half like a butchered steer".

But it is not all war. The artist takes us with him across the changeless face of Italy—to Pompeii, and the incongruity of a Bofors gun poking up out of the peristyle of a Greco-Roman villa; to the great Basilica of San Giovanni in Venere, with its stone carving of an apocryphal "Orders Group"! We share his excited discovery of the van Orley tapestries in the refectory at Loreto. In St. Peter's we look over his shoulder as he records the solemn pageantry of the High Mass celebrated for the Royal 22e Régiment.

Of the thirteen Comfort paintings reproduced in the book, the coloured frontispiece, *The Hitler Line*, will be recognized as one of the most dramatic of the artist's battle scenes. It must be observed that the author might have been better served by his proof-readers, particularly with respect to non-English names. This will undoubtedly be put right in the second edition which is sure to be demanded. *Artist at War* makes a valuable contribution to the record of the Italian Campaign. Charles Comfort has earned our thanks.

G. W. L. NICHOLSON.

*Colonel G. W. L. Nicholson is deputy director, Historical Section, Army Headquarters, Ottawa.*